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MARINE INFANTRY BATTALION

1980-1990

FINAL REPORT

September 1980

PROJECT TEAM:

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IN REPLY REFER TO
D 032/JCS/ccd
3900
8 October 1980

From: Commanding General
To: Commandant of the Marine Corps (Code PPO)

Subj: Marine Infantry Battalion 1980-1990 Study Report; submission of

Encl: (1) Study Report

1. The final report of the Marine Infantry Battalion, 1980-1990 study is forwarded for review and action as appropriate.

a. In addition to an executive summary at the front of the report, section XII is a draft Operational Handbook. This section will provide a slightly more specific overview for those reviewers desiring greater detail than an executive summary provides, but with insufficient time to study the entire report.

b. Subject to the exception discussed in paragraph 2 of this letter, the conclusions and recommendations contained in the report are concurred in, and are forwarded recommending approval and implementation.

c. At least a one-year trial period prior to formal adoption of any structure modification is encouraged to permit identification of organizational adjustments to further increase efficiency. In view of the fact that the proposed organizational changes would necessitate the concurrent introduction of some weapons variations, the need for a trial period is more strongly indicated.

2. In addition to the enclosed study of Marine infantry battalion structure, a MCDEC effort has been underway to examine Marine infantry weapons, especially small arms. This analysis of the infantry weapons needed by Marines in close combat was performed by a team of Marine officers, including several of the principal members of the infantry battalion study team. Contractor assistance was also involved. By combining the paramount finding of the weapons study with the structure proposed in the battalion study, the utility of slightly modifying the structure recommendation becomes apparent.

a. The foremost weapons study conclusion was that the Marine infantry battalion has a definite and valid requirement for a relatively lightweight crew-served automatic grenade launcher. The study group recommended the Mark 19 automatic grenade launcher to fill this need on an immediate basis.

(1) The addition of the Mark 19 grenade launcher to the infantry battalion's arsenal provides a weapon capable of engaging and defeating frontal armor on current Soviet personnel carriers at ranges in excess of 3000 meters (with superhigh velocity ammunition).

Subj: Marine Infantry Battalion 1980-1990 Study Report; submission of

(2) This significant anti-armor capability will permit more efficient utilization of the battalion's anti-tank weapons. By engaging non-tank armor at long ranges with the Mark 19, the battalion's DRAGON assets are made more valuable, in that they can be reserved for tank targets.

b. If the Mark 19 is added to the infantry battalion's structure, the study's recommended TOW anti-tank weapons systems could be centralized at the regimental level. The TOW was proposed primarily to provide needed range extension to the battalion's anti-armor (but not exclusively anti-tank) capability, an enhancement which could be furnished by the Mark 19.

c. The ability to mass antitank fires from organic regimental TOW launchers while retaining each battalion's local anti-tank DRAGON capacity, as well as gaining longer range anti-armor fires through use of the automatic grenade launcher, adds new firepower and balance. This anti-armor improvement considerably strengthens the stand-alone combat power of the regiment and MAB and is fully consistent with the characteristics of the modern battlefield. Moreover, added anti-tank/anti-mechanized punch is realized at lower levels without any drawdown on already existing division resources, i.e., the current 72 TOW launchers still remain in the Tank Battalion.

d. This recommended modification to the proposed structure can be implemented by adding a Weapons Company to each regiment, to consist of an Antiarmor Platoon and a Scout-Sniper Platoon.

(1) The Antiarmor Platoon would provide three TOW sections of three squads each at a personnel level of 1-48. This would centrally locate 18 TOW launchers in each regiment.

(2) The present Scout-Sniper Platoon (1-35) would remain at regiment as presently configured. Related to this, this Command also recommends that the eight messengers per battalion with additional Sniper MOS's be designated Scout-Snipers as their primary, not additional, duty thus bringing total trained Scout-Sniper assets to 1-59 per regiment.

(3) Personnel assets for this recommended addition to regimental strength should be identified in the course of reviewing the Force Structure study. Several structure recommendations of the Force Structure Study Group require new organizations for which no firm manning is established. In the course of specifically defining sizes and organizational strengths for proposed or modified units, the assets for a regimental anti-tank platoon should also be specified.

e. The infantry battalion's anti-armor platoon can be reconfigured to substitute a Mark 19 section for the proposed TOW section with no change in

Subj: Marine Infantry Battalion 1980-1990 Study Report; submission of

proposed personnel strength (0-22). The organization of the Mark 19 section into four squads of two weapons each facilitates employment of two weapons per squad when vehicles are available, or one per squad for footmobile (0-5 per squad) employment.

3. Approval of the proposed structure, modified as discussed above, is recommended. Implementation at an early date would permit rapid realization of the benefits and modernization discussed within the report.

B. E. TRAINOR

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MARINE INFANTRY BATTALION, 1980-1990

TABLE OF CONTENTS

		PAGE
EXECUTIVE SUMMARY		I
SECTION I.	INTRODUCTION	I-1
SECTION II.	THE ENVIRONMENT	II-1
	A. The Threat of the Eighties	II-2
	B. Employment in the Eighties	II-36
	C. Impact of Technology	II-51
	D. Summary	II-59
SECTION III.	ANALYSIS	III-1
	A. Degradation and Reconstitution of Combat Effectiveness	III-3
	B. Wargaming	III-73
	C. Weapons Systems	III-101
	D. Nuclear Vulnerability Assessment	III-181
	E. Command and Control (C^2)	III-212
	F. Logistics	III-229
SECTION IV.	FLEET MARINE FORCE ASSISTANCE	IV-1
	A. Field Evaluation	IV-1
	B. Infantry Battalion Structure Questionnaire	IV-25

Table of Contents (Cont.)

		PAGE
SECTION V.	MILITARY JUDGMENT	V-1
	A. Ground Air Defense	V-2
	B. Infantry Weapons	V-7
	C. Maneuver Capability	V-20
	D. Command and Control (C^2)	V-26
	E. Determination of Trade-off Values	V-32
	F. Advisory Panel Infantry Battalion Structure	V-38
SECTION VI.	SUMMARY	VI-1
SECTION VII.	CONCLUSION AND RECOMMENDATIONS	VII-1
	A. Structure A	VII-3
	B. Structure B	VII-6
	C. Structure C	VII-8
	D. Structure D	VII-59
SECTION VIII.	FMF RESPONSES	VIII-1
SECTION IX.	COST BENEFITS ANALYSIS	IX-1
SECTION X.	RECOMMENDED INFANTRY BATTALION STRUCTURE	X-1
	A. Table of Organization and Manpower Recapitulation-Structure "C"	X-1
	B. Implementation Plan	X-26

SECTION XI. ENHANCED STRUCTURE "C" XI-1

SECTION XII. DRAFT OPERATIONAL HANDBOOK XII-1

APPENDIX A. COPIES OF FMF RESPONSES A-1

LIST OF FIGURES

		PAGE
Section I	INTRODUCTION	
I-1	Representative Structures	I-2
I-2	General Methodology; A Triangulation Approach	I-5
Section II -	THE ENVIRONMENT	
II-1	Organization of the Motorized Rifle Company	II-8
II-2	Soviet Motorized Rifle Battalion Defensive Organization	II-9
II-3	Organization of the Motorized Rifle Battalion	II-11
II-4	Organization of Motorized Rifle Regiment	II-13
II-5	Organization of Motorized Rifle Division	II-14
II-6	Envisioned Use of Soviet Artillery Against an Amphibious Assault	II-20
II-7	Organization of the MRD's Artillery Regiment	II-21
II-8	Organization of the MRD's Antitank Battalion	II-22
II-9	Organization of the MRD's Multiple Rocket Launcher Battalion	II-23
II-10	Organization of the MRD's FROG Battalion	II-24
II-11	Soviet and Other Communist Countries Share Similar Military Doctrine and Organization	II-37
II-12	Several Different Structures Are Indicated By Different Threat Scenarios	II-38
II-13	Interest in International Crises	II-41
II-14	Mutual U. S. - USSR Interest by Region	II-42
II-15	U.S. - USSR Involvements in Conflicts	II-43
II-16	Recent Conflicts Relative to Sea Accessibility	II-45
II-17	Relationship Between Amphibious Accessibility and Urbanization	II-47
II-18	Impact of Technology on the Infantry Battalion of the Eighties	II-53

LIST OF FIGURES (cont'd)

PAGE

Section III - RESULTS OF ANALYSES

Section IIIA - DEGRADATION AND RECONSTITITION OF COMBAT EFFECTIVENESS

III-1 Model of Commander's Decision Time as a Function of Personnel Casualties III-8

III-2 Personnel Essential Teams for the Rifle Platoon III-12

III-3 Materiel Requirements for Each Essential Team III-14

III-4 The Reconstitution of Essential Teams As a Function of Time III-16

III-5 Degradation of Personnel and Materiel (Rifle Platoon-Sustained) III-18

III-6 Personnel Chokepoints III-20

III-7 Materiel Chokepoints III-20

III-8 Degradation of Personnel and Materiel (Rifle Platoon-Surge) III-24

III-9 Personnel Chokepoints III-25

III-10 Materiel Chokepoints III-26

III-11 Personnel Essential Teams for the Weapons Platoon (Sustained) III-28

III-12 Materiel Essential Teams for the Weapons Platoon (Sustained) III-29

III-13 Degradation of Personnel and Materiel (Weapons Platoon-Sustained) III-31

III-14 Personnel Chokepoints III-32

III-15 Materiel Chokepoints III-33

III-16 Degradation of Personnel and Materiel (Weapons Platoon-Surge) III-38

III-17 Abbreviated Personnel Chokepoint Summary III-39

III-18 Materiel Chokepoints III-39

III-19 Personnel Essential Teams (Rifle Company-Sustained) III-41

LIST OF FIGURES (cont'd)

PAGE

Section IIIA - Degradation and Reconstitution of Combat Effectiveness (cont'd)

III-20 Materiel Essential Teams (Rifle Company Sustained) III-42

III-21 Degradation of Personnel and Materiel (Rifle Company-Sustained) III-44

III-22 Abbreviated Personnel Chokepoint Summary III-45

III-23 Materiel Chokepoints III-46

III-24 Materiel Chokepoints III-51

III-25 Personnel Essential Teams for the Weapons Company III-53

III-26 Materiel Requirements for Essential Fire Support Teams III-54

III-27 Weapons Company Attack (Sustained) - Equal Degradation of Personnel and Materiel III-57

III-28 Personnel Chokepoints III-58

III-29 Materiel Chokepoints III-59

III-30 Personnel Essential Teams for H&S Company III-62

III-31 Materiel Essential Teams for H&S Company III-63

III-32 Degradation of Personnel and Materiel (H&S Company) III-64

III-33 Personnel Chokepoints III-66

III-34 Materiel Chokepoints III-66

III-35 Factorial Analysis Results III-68

III-36 Summary of Potential Improvements III-70

III-37 Readiness Evaluation III-72

Section IIIB - WARGAMING

III-38 Typical Structure of Blue Elements III-75

III-39 Index to Line-of-Sight Blocks III-77

III-40 Computer-Produced Line-of-Sight Index III-78

III-41 Wargame Area Showing Landing Zones III-80

PAGE

Section IIIB - Wargaming (cont'd)

III-42 Wargame Sequence III-83

III-43 Recap of Play/Structure Frequency III-84

III-44 Wargame Rules III-85

III-45 Total Movement of Maneuver Elements III-88

III-46 Average Movement of Maneuver Elements III-89

III-47 Attrition of Blue and Red Elements Relative to Mobility III-91

III-48 Percentage Change of Blue Attrition to Red Attrition - Relative to Mobility III-91

III-49 Firepower Ratios of Red-Blue III-92

III-50 Change in Ratio of Red Firepower to Blue Firepower - Infantry Battalion Wargame III-93

III-51 A/T Weapons Frequency of Usage III-94

III-52 Wargame Effects III-96

IIIC - WEAPONS SYSTEMS ANALYSIS

III-53 Organic Weapons by Type III-107

III-54 Weapons System - Type Measures of Effectiveness III-119

III-55 1980 Infantry Battalion Organic Fire Projection Array III-120

III-56 1980 Infantry Battalion Organic Weapons System and Crew-Size III-122

III-57 Small Arms Data III-124

III-58 Future Assault Weapons Data III-134

III-59 Indirect Fire Weapons Data III-140

III-60 Infantry Mortar Shell/Fuze Array III-141

III-61 Infantry Mortar Sustained Rate (s) of Fire III-143

III-62 Infantry Mortars Lethality Index III-144

PAGE

Section III C - Weapons Systems Analysis (cont'd)

III-63 Infantry Mortar Lethality Product III-145

III-63.A Infantry Mortar Multiple Tube Lethality Product III-146

III-64 Summary of Infantry Mortar MOE's III-147

III-65 Anti-Armor Weapons Data III-151

III-66 Defensive Posture of Helicopter-Lifted Battalion III-154

III-67 Enemy Closure Rates III-156

III-68 Antiair Weapons Data III-165

III-69 Organizational Structure of FAAD Battery III-167

III-70 FAAD Component Support of ATFs III-168

III-71 FAAD Command and Control III-168

III-72 Forward Antiair Defense Envelope III-169

III-73 Example of Task Weaponization III-173

III-74 Infantry Battalion Weapons Mix III-175

IIID. NUCLEAR VULNERABILITY ASSESSMENT

III-75 Situation Map for Pilot Study with 500 Meter Grid Squares III-183

III-76 Terrain Map Used in the Wargame III-184

III-77 Sample Deployments for Structure A Using Wargame Terrain III-186

III-78 Sample Deployments for Structure B Using Wargame Terrain III-187

III-79 Sample Deployments for Structure C Using Wargame Terrain III-188

III-80 Weapons Lethality Matrices for Exposed Personnel III-189

III-81 Delivery Error Matrices III-190

III-82 Aiming Point Probabilities for Pilot Study III-192

III-83 Pilot Study Impact Probabilities (x 10,000) for Small Delivery Error III-193

PAGE

Section IIID - Nuclear Vulnerability Assessment (cont'd)

III-84 Pilot Study Impact Probabilities (x 10,000) for Medium Delivery Error III-194

III-85 Pilot Study Impact Probabilities (x 10,000) for Large Delivery Error III-195

III-86 Aiming Point Probabilities III-196

III-87 Impact Probability (x 10,000) for Small Delivery Error III-196

III-88 Impact Probabilities (x 10,000) III-197

III-89 Casualties for Four Weapon Yields Using Pilot Study Deployments III-198

III-90 Casualties from Level 2 Yield Weapons Using Wargaming Deployments III-201

III-91 Casualties from Level 5 Yield Weapons Using Wargaming Deployments III-202

III-92 Casualties from Level 2 Yield Weapons Using Third Phase Deployments III-204

III-93 Casualties from Level 5 Yield Weapons Using Third Phase Deployments III-205

Section IIIE - COMMAND AND CONTROL (C^2)

III-94 Assessment of Human Factors of Infantry Battalion Officer Billets III-218

III-95 Message Flow Summary Within An Infantry Battalion III-220

III-96 MTACCS System Impact at Levels of Command III-221

III-97 MTACCS Impact upon Skills and Skill Level III-226

III-98 Comparison of Battalion COC Radio Nets Required Before and After TCO III-227

III-99 Comparison of pre-TCO and TCO COC Complexes III-227

III-100 How much MTACCS is Suitable for the Infantry Battalion? III-228

Section IIIF - LOGISTICS

III-101 Mobility Evaluations for an Infantry Battalion III-233

III-102 H&S Company Elements Common Among Battalion Alternatives III-233

PAGE

Section IIIF - Logistics (cont'd)

III-103 Common H&S Company Elements Included in Initial Assault III-234

III-104 Attachments to Battalion Landing Team III-234

III-105 Relative Helicopter Loading Requirements for Battalion Alternatives III-236

III-106 Relative Helicopter Loading Requirements for Notional BLT's III-237

III-107 Selected Major End Items of Equipment-Marine Infantry Battalion III-238

III-108 Communications-Electronics Major End Items for Infantry Battalion III-239

III-109 Lift Requirements of Comm-Elect Major End Items III-239

III-110 Light, High Mobility Tactical Truck (5/4 Ton) III-240

III-111 Comparison of Lift Capabilities of Motor Transport End Items III-241

Section IV - FLEET MARINE FORCE ASSISTANCE

IV-1 Field Evaluation - Rifle Squad Test Configurations IV-4

IV-2 Control of the Squad in the Attack IV-10

IV-3 Lack of Control of the Squad in the Attack IV-11

IV-4 Characteristics of a Rifle Squad in the Attack IV-13

IV-5 Size of the Fire Team IV-14

IV-6 Squad Security During Casualty Evacuations IV-15

IV-7 Individual Average Loads IV-19

IV-8 Crew-Served Weapons Evaluation Results IV-21

Section V - MILITARY JUDGMENT

V-1 Air Defense Environment is Characterized by Command Control Aspects V-5

V-2 Field Test of M16 and M60 ..... V-9

V-3 Ranges of Organic and Supporting Arms (less Air) V-17

V-4 Band of Least Firepower V-19

PAGE

Section V - Military Judgment (cont'd)

V-5 Comparison of Availability of Maneuver and Reserve Elements V-22

V-6 Evaluation of Design Attributes by Importance of Contribution to Mission V-35

V-7 Study Advisory Panel Infantry Structure V-39

Section VI - SUMMARY

Section VII - CONCLUSIONS AND RECOMMENDATIONS

VII-1 Structure A VII-4

VII-2 Structure B VII-7

VII-3 Structure C VII-9

VII-4 Firepower Comparison VII-11

VII-5 Firepower and Personnel Comparison VII-13

VII-6 Weapons System Density VII-15

VII-7 Firepower Balance VII-15

VII-8 Infantry Battalion Maneuver Units VII-17

VII-9 General Characteristics VII-18

VII-10 Anti-armor Weapons Destruction Capability VII-24

VII-11 Rifle Company Structure VII-26

VII-12 Rifle Platoon Structure VII-27

VII-13 Weapons Platoon Structure VII-29

VII-14 Combined Arms Company Structure VII-34

VII-15 Mortar Platoon Structure VII-37

VII-16 Infantry Mortars Weighted Unit Value Comparison VII-38

VII-17 Anti-armor Platoon Structure VII-41

VII-18 Anti-armor Comparison VII-42

VII-19 Heavy Machinegun Section VII-43

VII-20 H&S Company Structure VII-46

PAGE

Section VII - Conclusions and Recommendations (cont'd)

VII-21 Communications Platoon Series Transition VII-52

VII-22 H&S Company, Communications Platoon VII-53

VII-23 H&S Company, Service Platoon VII-54

VII-24 Structure D VII-60

Section VIII - FMF RESPONSES

Section IX - COST BENEFITS ANALYSIS

IX-1 Infantry Battalion 10-Year Life-Cycle Cost(s) IX-3

IX-2 Acquisition Costs IX-4

IX-3 Total (10-Year Life-Cycle) Costs IX-5

IX-4 Infantry Battalion Comparative 10-Year LCC IX-6

IX-5 Infantry Battalion Cost Analysis (Cardinal) Total-Utility Function IX-7

IX-6 Infantry Battalion Cost Analysis (Marginal Utility Function) IX-10

IX-7 Type Maneuver Unit IX-13

IX-8 Strength Matrix IX-14

IX-9 Infantry Battalion Cost Analysis (Marginal-Cost Utility Function) IX-15

IX-10 Infantry Battalion Cost Analysis (Marginal-Utility Function) IX-17

Section X - RECOMMENDED INFANTRY BATTALION STRUCTURE

Section XA - TABLE OF ORGANIZATION AND MANPOWER RECAPITULATION STRUCTURE "C"

X-1 Structure "C" X-2

Section XB - IMPLEMENTATION PLAN

X-2 "I" Series X-29

X-3 FY-81 Battalion Structure X-31

X-4 FY-82/83 Battalion Structure X-33

X-5 FY-84/85 Battalion Structure X-35

Section XI - ENHANCED STRUCTURE "C"

XI-1 Enhanced Structure "C" II-4

Section XII - DRAFT OPERATIONAL HANDBOOK

Appendix A - COPIES OF FMF RESPONSES

THE MARINE INFANTRY BATTALION

1980-1990

EXECUTIVE SUMMARY

INTRODUCTION

This report presents the results of a study to recommend the structure of the Marine infantry battalion for the 1980-1990 period. The study was conducted by the Development Center, Marine Corps Development and Education Command, Quantico, Virginia, in conjunction with Fleet Marine Force (FMF) Commanders and the Commanding General, Fourth Marine Division, and was facilitated by the positive and continuous guidance of a steering committee and a Study Advisory Panel. The study represents the formulation of cumulative knowledge, analyses, experience, and judgment into a recommended infantry battalion organizational structure capable of meeting its proportional share of combat threat and defeating it decisively.

BACKGROUND

The Commandant of the Marine Corps (CMC) directed the development of "an optimum infantry battalion for the nineteen-eighties." Initializing and continuing guidance for the development of this infantry battalion included:

- The infantry battalion mission will not change.
- The infantry battalion will be organized for offensive combat against the threat of the eighties.

- The infantry battalion will be structured to include approximately 900 Marines (officers and enlisted).
- The infantry battalion will be structured for the most effective utilization of personnel, weapons, equipment, and technology of the eighties.

In response to this tasking and its attendant guidance, several small study efforts were performed, rather than a more traditional, larger scope, study. The study report compiles the collective resources and input of Headquarters, U.S. Marine Corps (HQMC) agencies, FMF commands, the Marine Corps Development and Education Command Centers, and selected government contractors.

These vast resources provided study input in considerable quantity ranging from historical study information to current-day capabilities, improvements/requirements, to future tense needs and availability. The form of these inputs was diverse and the quantity was large, including subjective assessments and estimates, literature searches, individual and agency point papers, opinion questionnaires, analytical wargaming, technical weapons system data analyses, tactical field testing and evaluations, computer simulations, and constant military judgmental and experiential dialogue.

Assimilation, interpretation, reduction, comparison, and display of this array of information was conducted by a team of Marine officers from the Systems Analysis Branch, Concepts, Doctrine and Studies Activity, (CDSA), Development Center, Marine Corps Development and Education Command, Quantico, Virginia. This process produced a recommended infantry battalion organization and structure as set forth in this report. The study

results are a product of both analysis and Marine judgment with emphasis on judgment.

SCOPE

The scope of the study included only those considerations of mission, character, personnel, items of equipment, and weapons systems associated with the United States Marine Corps infantry battalion. The study did not consider infantry units above the battalion level, nor specialized configurations (e.g., mechanized, raid, etc.) normally derived from task-organization processes. The scope of the study included as many considerations of concept, technology, and feasibility as were capable of being formulated, assessed, and evaluated by the study team.

ASSUMPTIONS

- That the infantry battalion mission will remain unchanged throughout the 1980-1990 time frame.
- That the threat stated in the study report is representative.
- That the infantry battalion will not fight without nonorganic support.
- That the personnel strength availability of "about 900" will not appreciably change in the near-term.
- That personnel, weapons system acquisition, maintenance, and training costs associated with an optimal structure can be programmed at present.

ADDITIONAL CONSIDERATIONS

The study group determined that the initializing guidance for this study implied two additional considerations which would affect infantry

battalion structure:

- That the "optimal 900-man" infantry battalion may not be the truly "optimal" infantry battalion.
- That combat considerations will receive higher trade-off priority than garrison demands.

OBJECTIVES

Weighing the factors of scope, assumptions, and additional considerations vis-a-vis guidance and tasking, the purpose of the study was considered to be the determination of the optimal 900-man infantry battalion structure capable of combat success against the threat of the 1980's. In order to accomplish this, the following specific objectives were set:

- To determine the most likely threat to the Marine infantry battalion of the 1980's.
- To substantially increase the organic firepower potential of the Marine infantry battalion.
- To increase the combat unit maneuver potential of the Marine infantry battalion.
- To avoid elimination of current combat support and combat service support capabilities organic to the Marine infantry battalion.
- To develop the optimal 900-man infantry battalion Table of Organization.
- To establish an organizational structure for the Marine infantry battalion which is capable of absorbing anticipated weapons systems and command and control systems technology of the future.

- To determine cost-benefits derived from the optimal 900-man Marine infantry battalion.
- To provide tactical employment concepts and techniques of the optimal 900-man Marine infantry battalion.
- To suggest a plan for implementation of the optimal 900-man Marine infantry battalion.

THE THREAT OF THE EIGHTIES

That enemy threat most likely to be encountered by a Marine infantry battalion was considered typified by the organization and doctrine found in the Soviet Motorized Rifle Division (MRD). This unit was selected due to its likelihood of employment as the defensive force to counter amphibious assaults and anticipated subsequent operations ashore. Although a Soviet MRD is specifically discussed in the report, the points apply equally to the doctrinal and organizational capabilities of several other communist nations, including Cuba, Iraq, North Korea, and Vietnam.

That the Soviets envision the conduct of amphibious operations by United States forces to be a distinct threat is attested to by extensive writings by Soviet officers. Both official and unofficial publications address the problems of defending against amphibious assault and present excellent assessments of these problems and means for overcoming them. This analysis of Soviet defense against amphibious operations was, therefore, considered from the Soviet viewpoint.

Several apparent trends in American involvement in modern international conflicts were considered. It was concluded that there is a pattern which indicates a greater likelihood of USMC infantry battalion

employment in the 1980's against a Soviet or Soviet-like adversary than against one otherwise organized. Furthermore, a review of post-1946 crises showed that a significant number of them occurred in areas accessible to U.S. forces by sea. The affinity between amphibious accessibility and MOBA along with these two conclusions favor the design of the USMC infantry battalion of the eighties around a sufficient amount of combat power to face a Soviet-like opponent in an amphibious setting, and to have the flexibility for almost-certain MOBA as well as other specialized operations.

To define the elements of combat power needed to face such an opponent, a review of current intelligence sources was performed. This assessment identified the strong points of the Soviet/Soviet-like organizations anticipated during the 1980's. These threat capabilities suggested several features which must be considered in designing an adequately forceful Marine infantry battalion.

Threat capabilities that required corresponding USMC structure or other actions included: maneuver, firepower, engineer, aviation, and radioelectronic combat potential.

The likelihood of amphibious and urban operations calls for structural consideration of logistics (both MOBA and amphibious), command and control, special firepower needs, and intelligence and/or reconnaissance elements.

In addition to threat capabilities for the eighties, the impact of U.S. technological developments was also considered. Some of the technology expected to be implemented in military hardware throughout the next decade will dampen the effect(s) of certain threat strengths, but

the remaining threat capabilities will require counterbalance through modifications in structure.

METHODOLOGY

Development of the infantry structure began by establishing a baseline battalion against which several alternative infantry battalion patterns could be compared. In order to provide as firm a point of departure as possible, the present three rifle company interim structure ("I" Series) was adopted as the baseline. Next, more than 100 alternative structures were briefly designed and boiled down into ten representative structure types. This collection of options provided the ability to analyze a wide range of organizational possibilities ranging from a three-rifle company battalion with nine-man squads to a more traditional four-company base with a 13-man squad. The final recommendation is a variant of one of these, with modifications as indicated by various portions of analysis or testing.

The actual conduct of the study consisted of a number of independent analyses rather than a single examination. To make the results of the project as credible as possible, the study was planned so that the results of one test or analysis could be validated or refuted by the results of at least one other test or analysis. In almost every case, this was possible.

The study plan recognized the validity of Alain C. Enthoven's advice (that, "(Systems analysis) is a reasoned approach to highly complicated problems of choice, characterized by much uncertainty...it is not a substitute for judgment,") and tempered the use of pure analysis with

military experience. Thus, a triangulation approach was used to conduct the study with the results of analytic efforts being strongly filtered through FMF comments and finally, the professional experiences of the members of the advisory panel. Thus, the structures which are recommended are as much the results of mature, professional judgment as of analysis and measurement. It is this combination of seasoned opinion with quantitative analysis that best describes the specific methodology used in this project.

FINDINGS

The following findings were extrapolated from the vast array of inputs examined during the study. Major issue findings are:

- That the current Marine infantry battalion ("I" Series T/O) is insufficiently structured to assure meeting and defeating its proportional share of the most likely threat. Specifically,
  - That the current "I" Series T/O does not maximize the maneuver potential of a 900-man sized infantry battlion.
  - That a 900-man sized infantry battalion organized as per the recommended structure of this report significantly enhances infantry maneuver potential.
  - That the current "I" Series T/O does not maximize the firepower potential of a 900-man sized infantry battalion.
  - That a 900-man sized infantry battalion organized as per the recommended structure of this report significantly increases infantry firepower potential.

●● That the current "I" Series T/O does not possess a sufficient array of weapons system types to credibly face the characteristic threat force of the 1980's. Specifically,

●●● The current infantry battalion is highly susceptible to modern enemy attack-helicopter assault for lack of adequate organic air defense weapons systems.

●●● The current infantry battalion is highly vulnerable to modern enemy armored assault for lack of sufficient organic, long-range stand-off, antiarmor weapons systems.

●●● The current infantry battalion is severely limited in its ability to attack fortified positions and built-up areas for lack of an organic assault weapon.

●●● The current infantry battalion rifle squad is subject to enemy suppression for lack of its own organic suppressive-fire, long range, squad-level automatic weapon capability.

● A personnel size of "about 900" for a foot-mobile, light infantry battalion with enhanced firepower is not "optimal".

● A Table of Organization of approximately 990 (Section XI) appears closer to "optimal" for a foot-mobile, light infantry battalion.

CONCLUSIONS

Based upon the major issue findings, the study concludes:

● That the current "I" Series T/O is not desirable as an infantry battalion organizational structure.

● That a 900-man sized infantry battalion organized as per the recommended structure of this report is preferable in terms of

infantry maneuver potential.

- That needs and requirements exist for a broader array of weapons system types to enable the infantry battalion to meet and defeat its proportional share of the enemy threat. Specifically,
  - That the infantry battalion of the 1980's requires an adequate organic air defense capability against modern enemy attack helicopters.
  - That the infantry battalion of the 1980's requires a sufficient organic, long-range, heavy antiarmor capability against modern enemy armor.
  - That the infantry battalion of the 1980's requires an organic, systematically designed, assault weapon capability for use against fortified positions/bunkers and in built-up areas.
  - That the infantry battalion rifle squad of the 1980's requires an organic, long-range, suppressive fire capability against enemy personnel.
- That a Marine infantry battalion organized as per the recommended structure of this report is optimal for a 900-man sized foot-mobile, light infantry battalion.
- That a Marine infantry battalion organized as per the recommended structure of this report (Section X) with the additional personnel listed in Section XI included to increase the size to about 990, is optimal for a foot-mobile, light infantry battalion.

FINAL RECOMMENDATIONS

Based upon the major conclusions, the study recommends:

(1) That the current infantry battalion "I" Series Table of Organization be phased out in accordance with the implementation plan of this report (Section XB).

(2) That the Marine infantry battalion for the 1980's be configured after the recommended infantry battalion structure set forth in Section XA of the report.

(3) That if additional manpower spaces above those of the recommended infantry battalion structure set forth in this report (Section XA) become available, priority for their assignment be given to those billets listed in Section XI of the report.

(4) That the development (if necessary), acquisition and fielding of an infantry assault weapon, as described in Section IIIC of the report, be expedited with the highest priority.

(5) That consideration be given to acquiring and fielding an adequate anti-helicopter, air defense system that is organic to the Marine infantry battalion.

(6) That if the Marine infantry battalion recommended by the report is approved, the transition to that structure be phased as set forth in the implementation plan (Section XB) of the report.

(7) That if the Marine infantry battalion recommended by the report is approved, POM initiatives be directed to coincide with the transition phases and implementation plan (Section XB) of the report.

(8) That if the Marine infantry battalion recommended by the report is approved, the Commanding General, Marine Corps Development and Education Command, be directed to promulgate an infantry battalion

Operational Handbook (6-3) similar to that provided in the report (Section XII) prior to Phase II (FY 82/83) of the implementation plan (Section XB).

(9) That if the Marine infantry battalion recommended by the report is approved, the Commanding General, Marine Corps Development and Education Command, be directed to revise and publish affected Fleet Marine Force Manuals (FMFMs) prior to Phase III (FY 84/85) of the implementation plan (Section XB).

(10) That long term potential Marine infantry employment possibilities be continually reviewed vis-a-vis the 1980 battalion structure to ensure that future modernizations can be anticipated and be incorporated naturally instead of turbulently, which can erode readiness, efficiency, and morale.

(11) That the Commanding General, Marine Corps Development and Education Command, or some other command or agency, be assigned the responsibility and resources for constant and continual examination of the threat-versus-capability balance, and be charged to recommend structure modifications consistent with shifts in that balance.

I. INTRODUCTION

Background

The Commanding General, Marine Corps Development and Education Command, in conjunction with the Fleet Marine Force Commanders and the Commanding General, Fourth Marine Division, was tasked by the Commandant of the Marine Corps to develop an optimum infantry battalion table of organization for the eighties (CMC 090916Z May 79). Basic guidance for development of the optimum infantry battalion was as follows:

- the battalion mission will not change.
- the battalion structure will include approximately 900 Marines (officer and enlisted).
- the battalion will be structured for the most effective utilization of weapons, equipment, and technology of the eighties.
- the battalion will be organized for offensive combat against the threat of the eighties.

Development of the infantry structure began by establishing a baseline battalion against which several alternative infantry battalion patterns could be compared. In order to provide as firm a point of departure as possible, the present three rifle company interim structure ("I" Series) was adopted as the baseline. Next, more than 100 alternative structures were briefly designed and boiled down into ten representative structure types, as summarized in figure I-1. This collection

of options provided the ability to analyze a wide range of organizational possibilities ranging from a three-rifle company battalion with nine-man squads to a more traditional four-company base with a 13-man squad. The final recommendation was a variant of one of these, with modifications as indicated by various portions of analysis or testing.

	STRUCTURES				
	#1	#2	#3	#4	#5
RIFLE COS	4	4	4	3	3
RIFLE PLTS/CO	4	3	3	3	3
WPN SQD (TM)/WPN PLT	4	3	3	4	4
RIFLE SQDS/PLT	2	3	2	3	3
MARINES/SQD	9	9	13	13	9
TOTAL MARINES	905	897	897	903	900
	#6	#7	#8	#9	#10
RIFLE COS	3	4	3	4	3
RIFLE PLTS/CO	4	3	3	3	3
WPN SQD (TM)/WPN PLT	3	3	3	4	3
RIFLE SQDS/PLT	3	2	3	2	3
MARINES/SQD	11	11	11	11	10
TOTAL MARINES	921	909	894	909	900

Figure I-1 - Representative Structures

Study Organization

The study was performed by a team of Marine officers from the Development Center, MCDEC; although they used some contractor assistance for certain technical phases of the effort, such as computer support and wargame preparations, the study results are the product of Marine effort and judgment. A study Steering Committee consisted of the Commanding General, MCDEC, and his Deputies for Development and Education. In addition, an Advisory Panel was formed to furnish judgmental and experiential inputs to the study team; a summary of the panel's deliberation is included in this report.

General Methodology

Rather than a traditional study, this effort consisted of a number of independent analyses to permit a comprehensive examination. To make the results of the project as credible as possible, the study was planned so that the results of one test or analysis could be validated or refuted by the results of at least one other test or analysis. In almost every case, this was possible.

The study plan recognized the validity of Alain C. Enthoven's advice (that, "(Systems Analysis) is a reasoned approach to highly complicated problems of choice, characterized by much uncertainty ... it is not a substitute for judgment,") and tempered the use of pure analysis with military experience. Thus, a triangulation approach was

used to conduct the study. As figure I-2 depicts, the following categories of study tasks were performed:

1. Analytic measurements (models, wargames, quantitative analyses).

2. Real world concerns through FMF participation.

3. Professional experience through the military judgment of the advisory panel.

Analysis

This report presents the results of several analytical assessments of the infantry battalion. For the most part, these analyses began with a review of the present, interim, structure and developed conclusions on the strengths and weaknesses of various aspects of that organization. These specific conclusions were then re-examined to develop general observations as to desirable organizational features.

The following examinations comprised the bulk of those which were performed; Section III discusses specific results and detailed methodology:

- Command and Control - With assistance from the Marine Corps Tactical Systems Support Activity, the Study Team considered the impact of future command and control systems on the infantry battalion. In addition, the command and control structure of the battalion was thoroughly reviewed. A simulated command post exercise, and subjective evaluations

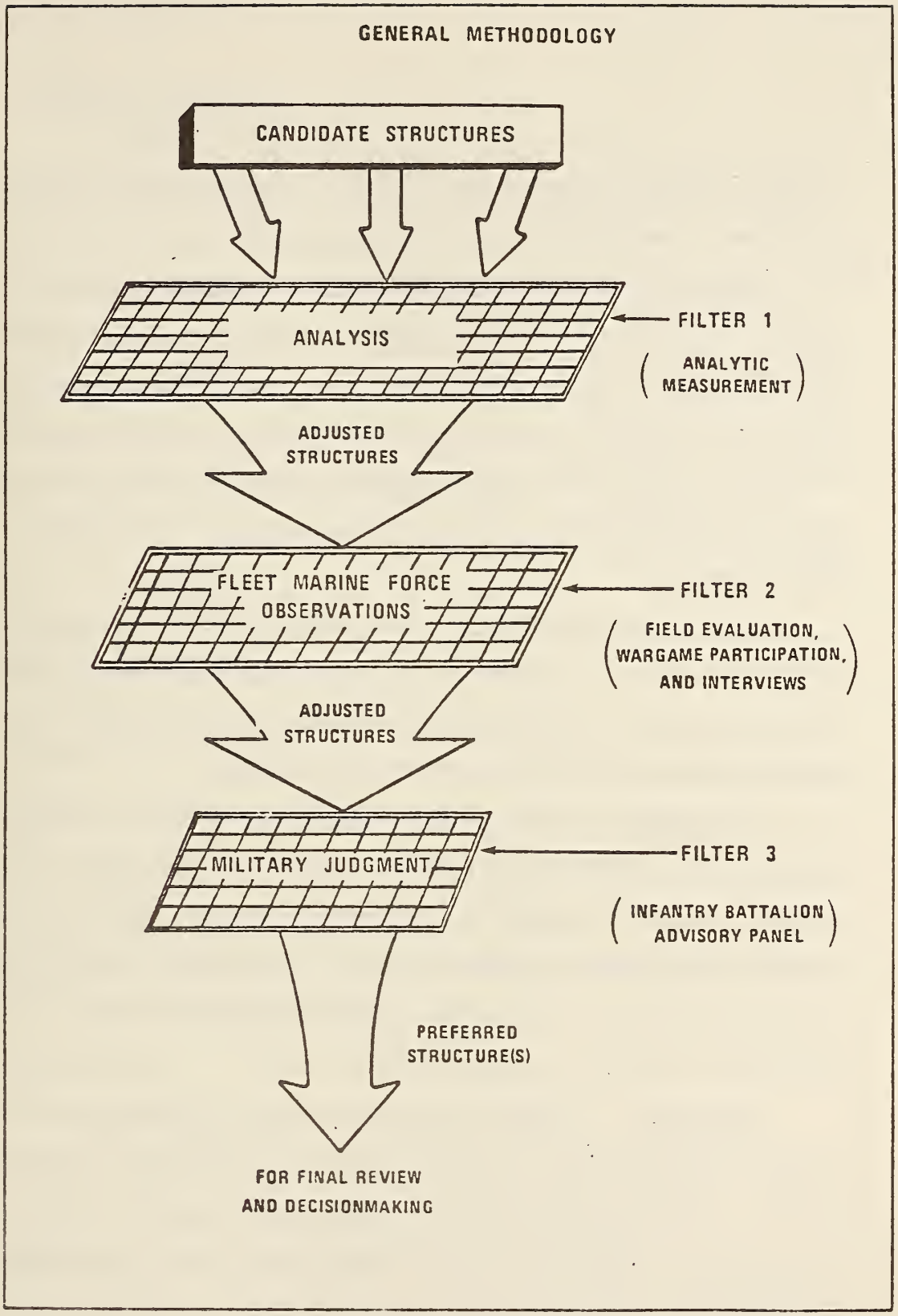


Figure I-2 - General Methodology; A Triangulation Approach

of the need for command and control in certain functional areas were two methods used for this review.

- Manpower Capability/Resiliency - A computer model was used to assess mission performance capability as a function of variable personnel strengths, i.e., as would occur in the case of combat casualties. The ability of the battalion to recover efficiency which had been reduced due to personnel (and equipment) losses was the primary measure of unit effectiveness.

- Logistics Capability - In similar fashion to the manpower evaluation, dependence on major equipment items was also assessed. Furthermore, the tactical mobility of the infantry battalion was carefully considered.

- Firepower - Thorough assessments of firepower needs, capabilities, and tradeoffs were made. This was one of the major areas of the study and demanded a large portion of the study team's efforts and attention. The Weapons Effectiveness Index/Weighted Unit Value (WEI/WUV) approach to combat power assessment was the primary analytic tool.

- Maneuver - A simple, battalion-level wargame was used as the primary means of evaluating this important characteristic. Participants in the wargame segment of the analysis were Marine officers from the Fleet Marine Force and MCDEC. The game was played in two phases: one with a four-company infantry battalion and the other with a three-company battalion.

FMF Participation

In addition to the wargame participation referred to above, FMF assistance was provided in two other areas: a field evaluation and response to a preference questionnaire.

The 2d Marine Division (1st Battalion, 6th Marines) evaluated several rifle squad, machine gun squad, company mortar squad, and battalion mortar section configurations. The Division also made available a large number of infantry officers to respond to a questionnaire prepared by the study team. Section IV of this report contains the results of these efforts.

Military Judgment

Members of the Advisory Panel played a large part in formulating a final, recommended structure. Although panel members met only two hours weekly, the considerable amount of experience which they represented facilitated in-depth discussions of several topics vital to structure design. Section V summarizes the discussions of the major issues which the panel considered.

Limitations

It was recognized early that, although desirable infantry battalion characteristics could be identified, not all desirable features could be aggregated into a unit with a size constraint. In other words, even though the study's main thrust was the development of an optimal

battalion, in reality what had to be produced was an optimal battalion of about 900 men. This restatement of the study's objective dictated that many signals perceived throughout the study would have to be ignored, or at best, reduced in scope.

Although this limitation was overriding, it was not applied arbitrarily. No unit capability identified as desirable was summarily rejected, and vigorous efforts were applied to incorporate every desirable feature in some form; the question of the infantry battalion's need for an organic air defense capability is an example.

Some other illustrations of the types of design tradeoffs required to reduce structure in an optimal fashion included the following:

- The question of three versus four rifle companies was evident immediately. Either configuration could be accomplished, but to achieve four would require that other battalion elements reduce their competing demands for the limited manpower spaces available.

- Similarly, squad size was a prime topic. In a four company battalion, thirteen-man squads would require 72 more persons than eleven-man squads. These 72 spaces in turn require a drawdown in other areas, perhaps even crew-served weapons.

- The size of the mortar platoon grew to an issue of concern. The question of whether the battalion could

continue to devote 82 Marines (plus 15 more from the Communications Platoon) to man eight weapons loomed large, and became more acute as the capabilities of the improved 60mm lightweight mortar were reviewed vis-a-vis the traditional 81mm mortar system.

- Other similar resource-oriented questions were also added, to create an extensive list: What are the requirements for improved tactical command and control systems? Must we actually have 19 cooks and bakers? Can we provide more NBC Specialists? Can we afford scout-snipers? Is administrative staffing adequate? Although four are preferred, are three-men machine gun teams adequate? What of garrison and training needs versus combat needs?

These, and many more, design dilemmas were treated as objectively as possible. Not all competing features could be accommodated. The final analysis which led to the preferred structure presented in this report was based on a purposeful attempt to incorporate as many meaningful measures as was possible, but to favor the adoption of those attributes which most enhanced the infantry battalion's ability to shoot, move, and communicate -- in combat.

Study Performance

The first effort, aside from planning and development of initial structures for evaluation, was a thorough consideration of the threat and the environment in which

that threat might manifest itself; section II reports the results of these considerations.

Next, the analyses and examinations (discussed in the general methodology portion) were conducted and their results were evaluated. Sections III, IV and V describe the actual study efforts, and section VI summarizes results and conclusions.

Section VII describes the preferred infantry battalion organization which evolved from the several study efforts and the threat assessment. The recommended battalion structure contains 916 officers and enlisted Marines.

II. THE ENVIRONMENT

Examination of the infantry battalion's mission is a necessary step in the development of its structure. In addition to that, though, the battalion's organization must be constructed to best perform that mission in the places, and against the enemies, which the battalion of the eighties will be likely to encounter. This tailoring of the battalion is especially important in light of the reduced resources now available. In other words, not only the WHAT, but also the WHO, WHERE, and HOW of Marine infantry battalion employment in the next decade must be carefully considered before more substantive questions of structure can be answered. This section of the report summarizes what the study team considered to be the likely environment in which Marine combat power can be expected to be applied in the midrange future. There are three units in this section describing the *Threat of the Eighties* (WHO), some reasons for anticipating certain places and types of *Employment in the Eighties* (WHAT and WHERE), and the *Impact of Technology* (HOW) on the battlefield of the eighties. In order to keep the body of this report accessible to as many reviewers as possible, classified discussions have been withheld.

IIA. THE THREAT OF THE EIGHTIES

Introduction

Most of this portion of section II was prepared by the members of the Threat Branch of the Intelligence Division, Development Center, MCDEC. Discussion is limited in scope to that enemy threat most likely to be encountered by a *Marine infantry battalion*. The threat force was considered as typified by the organization and doctrine found in the Soviet Motorized Rifle Division (MRD). This unit was selected due to its likelihood of employment as the defensive force to counter amphibious assaults and anticipated subsequent operations ashore. Although a Soviet MRD is specifically discussed in detail, it must be noted that the points contained in this report apply as well to the doctrinal and organizational capabilities of several other communist nations, including Cuba, Iraq, North Korea, and Vietnam.

That the Soviets envision the conduct of amphibious operations by United States forces to be a distinct threat is attested to by extensive writings by Soviet officers. Both official and unofficial publications address the problems of defending against amphibious assault and present excellent assessments of these problems and means for overcoming them. This analysis of Soviet defense against amphibious operations is, therefore, presented from the Soviet viewpoint as expressed in available literature. The focus is on the primary

maneuver element, the motorized rifle division, and those combat and combat support elements normally found in support of that division.

Intelligence Considerations

The Soviets acknowledge the capability of United States forces to conduct amphibious operations, and are concerned with finding answers to questions which traditionally interest forces opposing such operations: where, when, how and in what strength? The defender is faced with serious difficulty in determining the place and time of landing, and even greater difficulty in ascertaining the objectives and the direction of the main effort of the landing force.

However, while the 1990 defender will continue to be faced with the classic question of determining where to defend, he will also continue to enjoy certain advantages which have always accrued to defenders in such roles. Primarily, by virtue of having access to the objective area, he will have the opportunity to become far more knowledgeable of its physical aspects than will the attacker. He will, through modern analysis, be able to derive valuable projections of the manner in which these physical characteristics can influence the employment of the landing force.

Soviet writings stress the indispensable need for extensive intelligence and reconnaisssance by the defending force.

Thorough hydrographic and terrain reconnaissance is conducted to determine favorable landing sites and beach exits leading to terrain suitable for the conduct of operations. Careful consideration is given to beach gradients, tides and currents, inland relief, drainage, soil trafficability, road nets, and weather. In general, this activity is conducted by reconnaissance and engineer elements of the division.

Additionally, the commander and his staff will analyze United States amphibious doctrine. The objective of their effort is to tie knowledge of our doctrine with knowledge of the physical characteristics of the area to better estimate our objectives and landing force employment.

Planning Considerations

In defending against an amphibious operation, the motorized rifle division employs a variant of that form of defensive operation known in Soviet doctrine as deliberate defense. The deliberate defense has no exact counterpart in United States doctrine. It may be thought of as incorporating elements of both the area defense and the mobile defense, and is designed to maximize the structural and design strengths of the motorized rifle division. The disposition of the division's elements and the detailed plan of defense will be aimed at the following defense priorities:

- Destruction of the landing force by massed fires prior to its reaching shore.
- Should the landing force reach shore, containment by obstacles and maneuver elements, and the destruction of the landing force by massed fires on the beach.
- Should the landing force penetrate beyond the beach, counterattack and the prevention of withdrawal by massed fires of destruction, and the interdiction of reinforcements.

Heliborne/airborne forces are engaged enroute to their landing zones by all available air defense weapons. Once on the ground, these forces are engaged, contained, and eliminated by subordinate elements of the division or, if necessary, by the division general reserve. The defensive plan stresses the absolute necessity of preventing any linkup of waterborne and heliborne/airborne forces.

The motorized rifle division will defend in echelons. The relative size and strength of these echelons will fluctuate with each being assigned a variable front as wide as 40 kilometers; this is more than it would occupy in a land campaign. In any event, the defense (particularly anti-tank) is organized in depth. Neither the division nor any of its subordinate elements attempts to defend a continuous line. Rather, the entire position is defended by a series of strongpoints sited on militarily significant terrain, with intervening areas covered by fire, mines, and obstacles. The forward edge of the defended area is situated close to

the shoreline to extend the range of weapons as far seaward as possible. When dictated by tactical or terrain considerations, the forward edge may be withdrawn inland, but not usually more than 400-500 meters from the high tide line.

Once planned and sited, defensive positions are normally manned by a reduced force whose mission is to engage pre-invasion reconnaissance and underwater demolition elements. This allows the bulk of the division's forces to remain outside the range of pre-assault naval gunfire, while still retaining the flexibility to confront the main attack once identified. This manner of commitment creates a potential vulnerability since it entails major realignments of the defense while an engagement is in progress. Since the success of the defense is greatly dependent upon the division's major combat elements occupying pre-determined positions, any action which prevents this shift of forces seriously degrades defensive strength.

Organization of the Defense

The Motorized Rifle Company - The company strongpoint is the basic element of the defense, with the division's defensive sector being a series of such strongpoints.

- Strongpoints are normally occupied by a motorized rifle company reinforced by attached tank, mortar, and antitank elements. Regimental artillery often fires in direct support.

- Gaps between strongpoints are protected by mines, obstacles, tank ambushes, and artillery concentrations referred to as "fire sacks" or "fire pockets."

- Strongpoints of companies in first echelon units form the forward edge of the defense. In instances where the forward edge is located more than 50-100 meters from the shoreline, well-camouflaged separate emplacements for weapons of limited range such as machine guns and antitank weapons will be located in front of the forward edge.

- The system of strongpoints forms the basis of the integrated fire plan for the supporting arms of higher echelons.

- The company seldom utilizes a reserve. When one is formed, it will normally consist of a squad, reinforced by antitank and combat engineer elements.

- When time permits, both alternate and dummy positions are prepared.

- Figure II-1 shows the organization of this company.

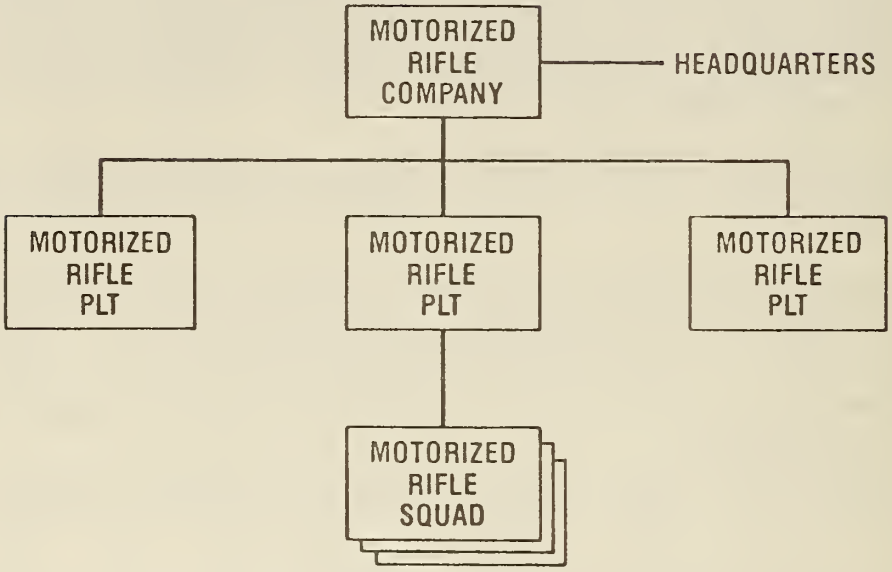
The Motorized Rifle Battalion - In defending against an amphibious assault, the basic maneuver element of the division is the motorized rifle battalion.

- The role of the motorized rifle battalion in defending against an amphibious assault is determined by the assigned mission, the peculiarities and importance of the assigned sector, the nature of the terrain, and the position of the battalion in the combat formation of the regiment. As an outgrowth of these factors, the battalion may defend on a front between 2.5 and 5 kilometers and a depth to 2 kilometers.

- Dependent upon the width of its sector, the battalion will defend in either one or two echelons, organized as depicted in figure II-2. The battalion reserve will usually be a reinforced platoon.

- A battalion operating in the regimental first echelon may defend on a main or secondary avenue of approach. A battalion defending on a main avenue of approach

MOTORIZED RIFLE COMPANY



	PERSONNEL			WEAPONS & EQUIPMENT																				
UNITS	OFFICER	ENLISTED	TOTAL	APC BMP	7.62MM LMG PKT (BMP COAX)	SAGGER (AT-3) BMP LCHR	73MM GUN (BMP)	7.62MM PKM	7.62MM AKMS	7.62MM SVD	SA-7 GRAIL*	80MM ATGL RPG-7	9MM PM PISTOL											
CO HQ	3	6	9	1	1	1	1	1	3		3		4											
MTR RIFLE PLT (3)	3	96	99	9	9	9	9	18	63	3		9	12											
TOTAL	6	102	108	10	10	10	10	19	66	3	3	9	16											

*DEPLOYED FROM BATTALION AS SITUATION DEMANDS.

Figure II-1 - Organization of the Motorized Rifle Company

SECTOR WIDTH	COMPOSITION OF ECHELONS	
	FIRST	SECOND
2.5 KILOMETERS OR LESS	TWO COMPANIES	ONE COMPANY
GREATER THAN 2.5 KILOMETERS	THREE COMPANIES	NONE

FIGURE II-2 - SOVIET MOTORIZED RIFLE BATTALION DEFENSIVE ORGANIZATION

will receive tank, antitank, and artillery reinforcements. A battalion defending a secondary avenue of approach is not usually reinforced; its mission is to prevent the movement of landing force elements to the flanks and rear of strongpoints on the main avenues of approach.

- A battalion defending in the regimental second echelon will be positioned in the interior of the regimental sector astride the most likely avenue of approach. In its assigned sector, it prevents the breakthrough of landing force elements into the interior, and destroys (independently or in concert with second echelon forces of adjacent units) those landing force elements which succeed in penetrating the first echelon defenses.

- As distinguished from defensive operations in a land campaign, both first and second echelon battalions may initiate local counterattacks independently.

- The battalion fire plan is organized to make maximum use of the range of organic, attached, and supporting weapons. The plan seeks to engage the landing force at maximum range while it is in the water, achieve maximum fire density at the shoreline, and ensure reliable effects on those units which penetrate beach defenses. To accomplish these objectives, a zone of effective fire is organized to extend seaward of the forward edge to maximum weapons range, and rearward to a depth of 400-500 meters. In addition, an antitank fire zone is established to a depth of about two kilometers. Firing positions are sited to allow maximum fire density on landing craft crossing the line of departure, as well as to permit shifting fires to targets on shore without displacement.

- The engagement of heliborne/airborne forces is the responsibility of the battalion reserve. The reserve, supported by artillery, will destroy heliborne/airborne forces as soon as possible after landing and before these forces have been able to organize. If this is not possible, the reserve will block the main avenues of approach leading to the rear and flanks of the battalion forward echelons, attempting to prevent friendly movement from the landing zone until the arrival of the regimental reserve, at which time a combined counterattack is launched.

- Figure II-3 shows the organization of this battalion.

The Motorized Rifle Regiment - The role of the motorized rifle regiment is to command and control its subordinate battalions, and to conduct coordinated counterattacks.

- The motorized rifle regiment defends in two echelons, with two battalions occupying the first echelon and one battalion in the second. This second echelon formation is not a reserve as we think of one. To the contrary, as with the motorized rifle battalion, second echelon forces are responsible for the defense of assigned sectors within the interior of the regimental position.

- The regimental general reserve will usually consist of:

  - One motorized rifle company.

  - Elements of the regimental medium tank battalion not attached to forward deployed battalions. This may be further supplemented by reinforcing units of the medium tank regiment of the division.

  - Regimental or divisional artillery elements (unlike our doctrine, the Soviets will place artillery in reserve).

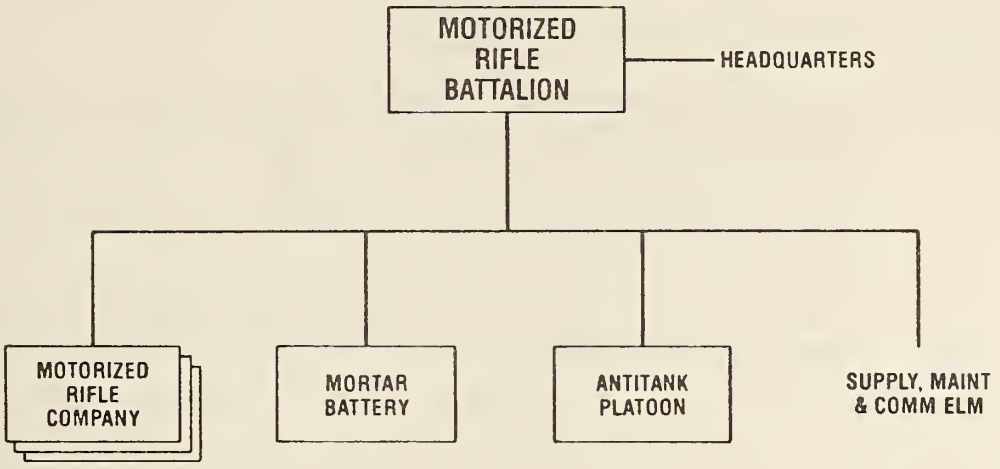
  - Elements of the regimental ATGM battery.

  - Elements of the regimental engineer company.

- The general missions of the regimental reserve are:

  - To repel landing force elements which have penetrated second echelon defenses.

MOTORIZED RIFLE BATTALION



	PERSONNEL			WEAPONS & EQUIPMENT																		
UNITS	OFFICER	ENLISTED	TOTAL	APC, BTR, BMP, BRDM-2	7.62mm LGM PKT, BMP (COAX)	SAGGER (AT-3) BMP LCHR	SAGGER (AT-3) MANPACK	73mm GUN (BMP)	73mm RCL GUN SPG-9	7.62mm LMG PKM	7.62mm AKMS	7.62mm SVD	9mm PM PISTOL	85mm ATGL RPG-7	120mm MORTAR	SA-7 GRAIL						
BN HQ	4	9	13	2	2						9		4									
MTR RIFLE CO (3)	18	306	324	30	30	30		30		57	198	9	48	27		9						
MORTAR BTRY	4	49	53								44		9		6							
ANTITANK PLT	1	13	14				2		2		13		1									
SUPPLY, MAINT & COMM ELEMENTS	1	35	36								30		6									
TOTAL	28	412	440	32	32	30	2	30	2	57	294	9	68	27	6	9						

Figure II-3 - Organization of the Motorized Rifle Battalion

- To destroy heliborne/airborne forces which are too strong for the reserve of the forward deployed battalions.

- To assist adjacent units in containing/counterattacking penetrations.

- To assist in counterattacks conducted by the general reserve of the motorized rifle division.

- Figure II-4 shows the organization of this regiment.

The Motorized Rifle Division - Since Soviet doctrine stresses maximum resistance at the water's edge, the motorized rifle division will normally defend in single echelon with all three regiments on line. The regiments and their subordinate battalions may employ one or two defense echelons.

- To allow the initiation of decisive action, a general reserve is maintained by the division. This reserve has two roles: (1) counterattack, containment, and destruction of landing force elements which have penetrated regimental defenses; (2) destruction of landing force elements which have been contained by regimental defenses, but which are too strong to be destroyed by them. This general reserve is armor-heavy and will usually consist of:

  - One motorized rifle battalion.

  - The independent tank battalion of the division, as well as those elements of the division medium tank regiment which have not been attached to motorized rifle battalions.

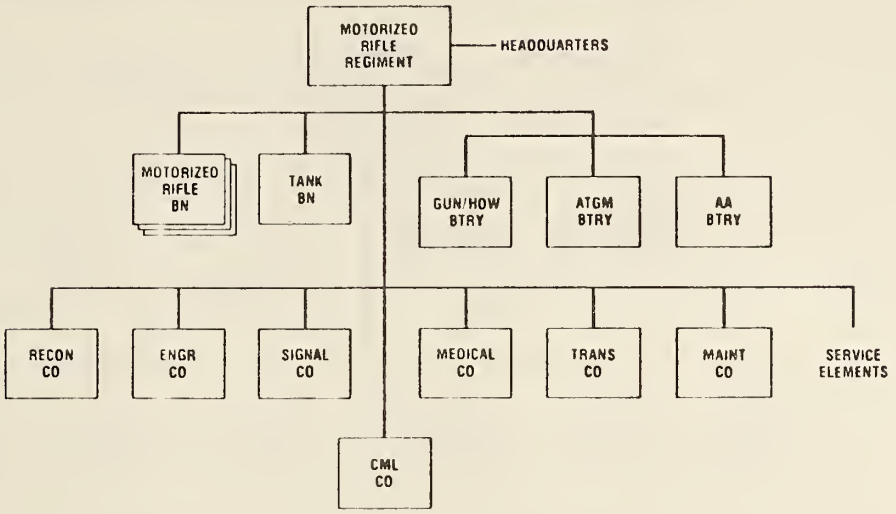
  - Elements of the division antitank battalion.

  - Elements of the division engineer battalion.

  - Elements of the artillery regiment.

- Figure II-5 shows the organization of the division.

MOTORIZED RIFLE REGIMENT

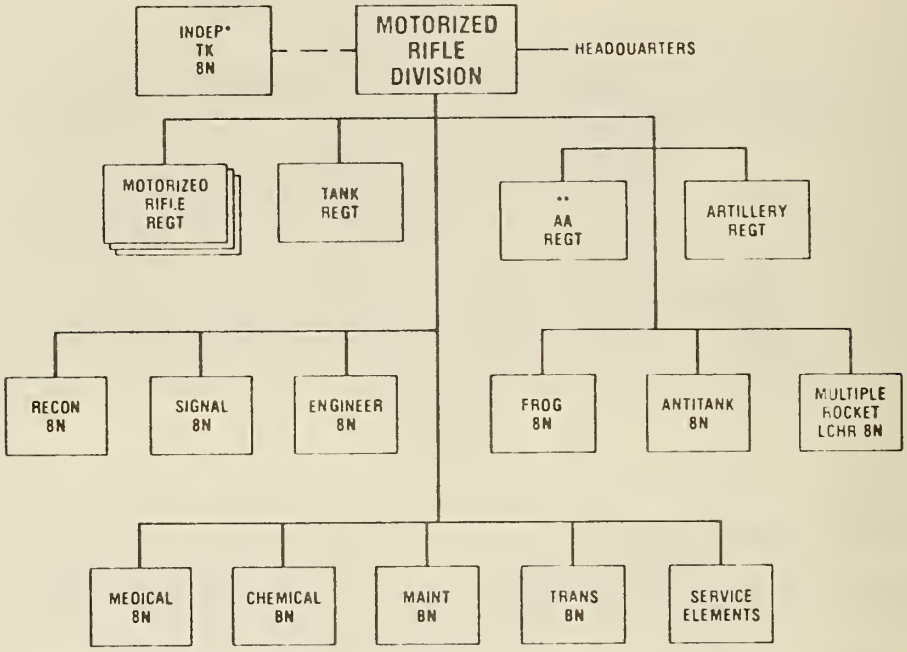


UNITS	PERSONNEL			WEAPONS & EQUIPMENT																		
	OFFICER	ENLISTED	TOTAL	TK MDM 55,62,72	TANK PT-76 AMPHIBIOUS	APC BTR-60 PA,PU,PB	APC BMP	APC, BRDM-2	MTRCL	7.62mm LMG PKM	23mm AA GUN ZSU-23-4	ATGM VEHICLE AT-2/3	ATGM MANPACK AT-3	73mm RCL GUN SPG-9	85mm ATGL RPG-7	120mm MORTAR	122mm GUN/HOW*	SA-7 GRAIL	TEL SA-9	RADAR (Gnd Surv) GS-12		
REGT HQ	28	32	60			1	1	4	4													
MTR RIFLE BN (3)	84	1236	1320			3	90	3		171			6	6	81	18		27				
TANK BN	23	185	208	40		1		1										9				
GUN/HOW BTRY	5	64	69														6					
ATGM BTRY	4	16	20									9										
AA BTRY	6	52	58								4								4			
RECON CO	4	43	47		3			9	5											1		
ENGR CO	5	53	58																			
SIGNAL CO	4	53	57			2																
CHEMICAL CO	1	34	35					2														
MEDICAL CO	4	23	27																			
TRANS CO	5	69	74																			
MAINT CO	3	47	50																			
SERVICE ELEMENTS	1	31	32																			
TOTAL	177	1938	2115	40	3	7	91	19	9	171	4	9	6	6	81	18	6	36	4	1		

*TOWED OR SELF PROPELLED.

Figure II-4 - Organization of Motorized Rifle Regiment

MOTORIZED RIFLE DIVISION



*MAY BE ORGANIC TO SOME BUT NOT ALL MOTORIZED RIFLE DIVISIONS.
**MAY BE REPLACED BY SA-8 OR SA-6 UNIT.

	PERSONNEL			WEAPONS & EQUIPMENT																		
UNITS	OFFICER	ENLISTED	TOTAL	TK MDM 55/62/72	TANK PT-76 AMPHIBIOUS	APC, BTR, BMP BRDM	MTRCL	7.62MM LMG PKM	23MM AA GUN ZSU-23-4	ATGM VEHICLE AT-3	ATGM MANPACK AT-3	57MM AA GUN* S-60	73MM RCL GUN SPG-9	85MM AT GL RPG-7	100MM AT GUN T-12	120MM MORTAR	122MM HOW**	152MM HOW**	122MM RL BM-21	TEL FROG-7	SA-7 GRAIL	TEL SA-9
DIV HQ	93	223	316																			
MTR RIFLE REGT (3)	531	5814	6345	120	9	351	27	513	12	27	18		18	243		54	18				108	12
TANK REGT	133	883	1016	95	3	15	7	3	4					8							27	4
ARTY & AA	195	1989	2184			15						24			18		36	18	18	4		
RECON BN	44	256	300		7	19	33							5								*
ENGR BN	35	350	385			10																
SIGNAL BN	27	253	280			4	13															
CHEMICAL BN	12	138	150			4																
MEDICAL BN	32	168	200																			
MAINT BN	20	180	200																			
TRANS BN	25	350	375																			
SERVICE ELEMENTS	16	154	170			5	20															
TOTAL	1163	10758	11921	215	19	423	100	516	16	27	18	24	18	256	18	54	54	18	18	4	135	16

*MAY REPLACED BY A SA-8 OR SA-6 UNIT.
**TOWED OR SELF PROPELLED.

Figure II-5 - Organization of Motorized Rifle Division

Artillery Support

Artillery support remains the keystone of Soviet operational planning. At the operational level, the commander's fire plan will integrate the fires of tube and missile systems with the strikes of tactical aviation. The fire support of artillery weapons available to the tactical commander is a major component of the operational plan.

To achieve reliable fire support, artillery is employed under centralized control and in great mass. Emphasis is placed on detailed planning and the coordinated production of fire plans to support a centralized combat arms operation.

Formally, Soviet artillery includes both missiles and tube systems for:

- Field Artillery (Soviet doctrine defines this as including howitzers, gun-howitzers, field guns, multiple rocket launchers, 120mm or larger mortars, and tactical rockets/surface missiles).
- Antitank Artillery.
- Air Defense Artillery.

Since this discussion concerns artillery of the motorized rifle division and its subordinate units, and since the only tactical rocket organic to the division (the Free Rocket Over Ground (FROG) system) is normally controlled by higher echelons, coverage will center on organic tube artillery and that allocated to the division from the Combined Arms Army and Front levels.

Artillery Organization for Combat - The command and organizational structure which insures flexibility in concentrating artillery fire on the enemy main attack is established by temporary, mission-oriented groupings. The formation of artillery into divisional or regimental artillery groups permits maximum exploitation of artillery by maneuver units and provides continuous artillery support with the retention of centralized control. Artillery groups usually consist of at least two battalions and may be composed of similar or mixed type units to include mortars, field guns, howitzers, and multiple rocket launchers. The command and staff elements of these groups are drawn from personnel available in the artillery element of the maneuver force.

- Division Artillery Group (DAG) - The DAG may vary in size from two to four battalions and is employed in general support of the division. If required (perhaps because of span of control, number of battalions available, or the assigned mission) the division may organize more than one DAG. The DAG assists the Combined Arms Army with the counterfire (counterbattery) mission, or may perform this mission independently if capable.

- Regimental Artillery Group (RAG) - Regimental Artillery Groups are formed by the division commander from organic, attached, and reinforcing non-divisional artillery battalions and are temporarily assigned the numerical designation of the supported regiment. In forming RAGs, the division commander allocates artillery assets based upon the concept of operations (the regiment defending the most likely landing beach receives the most artillery).

- Battalion Support - In addition to the supporting fires available from the DAG and RAG, motorized rifle battalions may be allotted up to a battalion of artillery in an attached or supporting role to provide both direct and indirect fire. Motorized rifle battalions also have a significant organic fire support capability in the 120mm mortar battery.

Artillery Relationships - It is standard procedure to augment the organic artillery available at various tactical levels by allocating additional artillery, either through attachment or the assignment of a supporting mission.

Soviet concepts of the relationship between artillery units and maneuver units are different from ours. Thus, an artillery battalion may be either attached or placed in support of a maneuver battalion. The methods of providing support depend upon the status of the artillery. An *attached* artillery unit assigned a mission to *support* a maneuver force remains subordinate to its parent artillery unit or group, but will carry out fire missions and tasks of the supported maneuver unit commander.

- Attached Artillery - An attached artillery battalion takes its orders from the maneuver battalion commander. Its batteries can be assigned to support maneuver companies; however, the battalion may still be called upon to support the maneuver regiment and receive fire missions from the RAG commander. The fire plan of an attached battalion will reflect specific support of the maneuver battalion to which it is attached. Normally, the period of attachment will cover the time needed to accomplish a particular tactical mission. However, the division commander or his representative who allocates artillery can change the mission of the artillery unit during the course of combat operations.

- Supporting Artillery - A supporting battalion remains subordinate to the parent artillery unit or group, but if it has no regimental missions, it will fire in support of maneuver battalions. Its batteries, however, cannot be assigned to support subordinate companies of the maneuver unit. Thus, a supporting artillery battalion will carry out fire missions for the maneuver battalions if the RAG commander permits or specifically directs the action.

- Allocation Procedures - The following are general procedures for the allocation of reinforcing artillery:
  - The division will allocate organic and attached artillery to maneuver regiments, particularly those defending vital sectors.
  - A regiment may place some of the artillery received from division in support of first echelon battalions.
  - Motorized rifle regiments retain their organic artillery.
  - Second echelon units are not normally reinforced with additional artillery until they are committed to counterattacks.

Artillery Command and Control - The DAGs and RAGs form the basic framework for the control of artillery fires in the division. Decisions relating to the employment of artillery are made on a centralized basis. The division commander, based on recommendations from his Chief of Rocket Troops and Artillery (CRTA), exercises control authority over all organic and allocated artillery within the division. The following general procedures are observed:

- The division commander specifies the artillery organization for combat and the tasks to be carried out by the artillery.
- The CRTA plans and coordinates fire planning.
- Artillery commanders are habitually collocated with their corresponding maneuver forces.
- The DAG commander(s) report directly to the CRTA.
- RAG commanders report directly to the supported regimental commander, while retaining contact with the CRTA.
- Artillery battalion and battery commanders keep their supported maneuver commanders informed and concurrently report to their controlling artillery headquarters.

Target Damage Criteria - Artillery fire missions are categorized by degree of damage and desired response. Soviet effectiveness criteria are more severe than ours in terms of suppression, neutralization, and destruction, and include:

- Harassment - Aims at about 10% damage and is employed to keep the enemy under cover and reduce the effectiveness of his aimed fire.
- Neutralization - Inflicts about 20-30% damage to temporarily reduce the enemy's attack capability.
- Annihilation - Inflicts 50-60% damage and completely destroys capability to fight until reconstituted.

Methods of Defensive Fire - In the following coverage of defensive fire planning, it should be noted that Soviet terminology for methods and types of fire are used. Figure II-6 contains typical Soviet use of these fire methods in defending against an amphibious assault:

- Fire Concentration --- Method of conducting fire against a single target or group of targets in a single area. When artillery is used alone, several batteries or battalions may be employed against the target area. This method is calculated by target area and may be planned or unplanned. In defending against amphibious assault, concentrations are planned against surface targets such as transports, inshore naval gunfire ships, landing craft assembly areas, and lines of departure. They are also planned to cover ground between strongpoints ashore.
- Barrage Fire --- A type of artillery fire consisting of laying a frontal or flanking fire barrage on a preselected line or lines in order to interdict movement by enemy infantry or tanks. It is normally employed to contain the movement of forces which have penetrated first echelon defenses and facilitate the counterattack of second elements.
- Rolling Barrage --- A type of artillery fire consisting of successive shifts of a powerful curtain of fire from one preselected, observed line to another. It will be fired at landing craft which have crossed the line of departure,

decreasing in range as the landing craft approach shore. The first barrage line is fixed at 6-8 kilometers from the coast, with the distance between succeeding lines not less than 800 meters. An artillery battalion is given a fire sector on each line on the basis of 50 meters per gun. Thus if an artillery battalion consists of 18 guns, the width of the battalion's barrage zone equals 900 meters

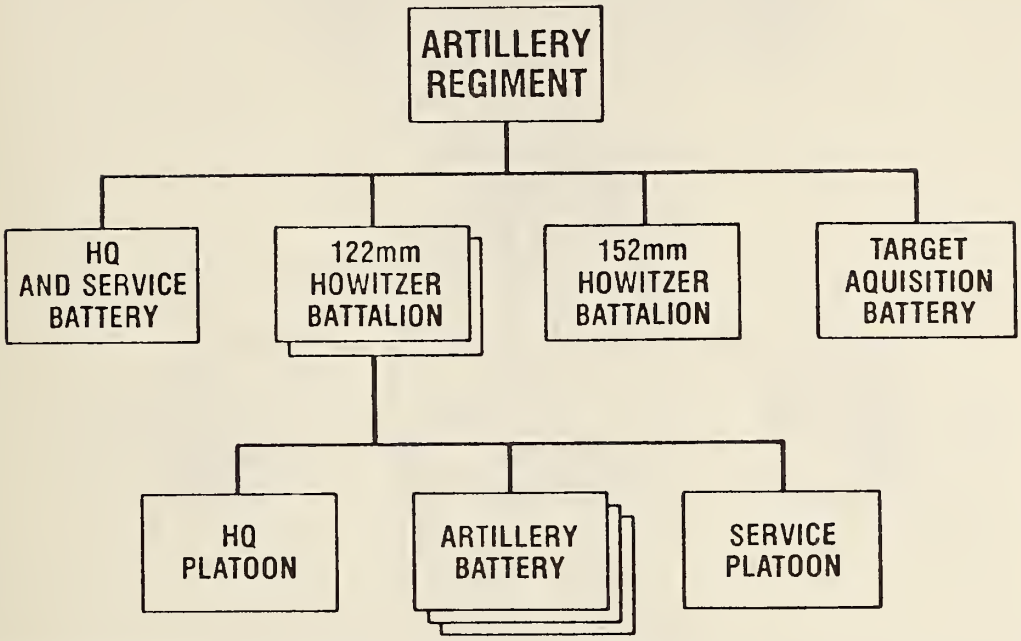
- Standing Barrage --- High density artillery fire used on preselected lines to obstruct movement of the enemy through them. Standing barrages are delivered against those landing force elements which have reached shore.

EVENT	LIKELY SOVIET ARTILLERY RESPONSE
ATF ENTERS EFFECTIVE RANGE	FIRE CONCENTRATIONS AGAINST AMPHIBIOUS SHIPPING, LANDING CRAFT ASSEMBLY AREAS, AND LINE(S) OF DEPARTURE.
LANDING CRAFT APPROACH SHORE	ROLLING BARRAGES AGAINST LANDING CRAFT.
LANDING CRAFT REACH SHORELINE	STANDING BARRAGES AGAINST LANDING CRAFT.
LANDING FORCE ELEMENTS PENETRATE FIRST ECHELON DEFENSES	COMBINATION OF FIRES TO: (1) SUPPORT COUNTERATTACK BY SECOND ECHELON UNITS (PRIORITY OF FIRES); (2) STOP ADVANCE BY LF ELEMENTS; (3) PREVENT LANDING OF MORE LF UNITS.
SOVIET COUNTERATTACK FAILS	STANDING BARRAGES TO CUT OFF LF ELEMENTS ASHORE, TO PREVENT WIDENING OF BEACHHEAD, AND TO ALLOW COUNTERATTACK BY GENERAL RESERVE.

FIGURE II-6-ENVISIONED USE OF SOVIET ARTILLERY AGAINST AN AMPHIBIOUS ASSAULT

- Figures II-7 through II-10 show the organization of the Motorized Rifle Division's artillery units.

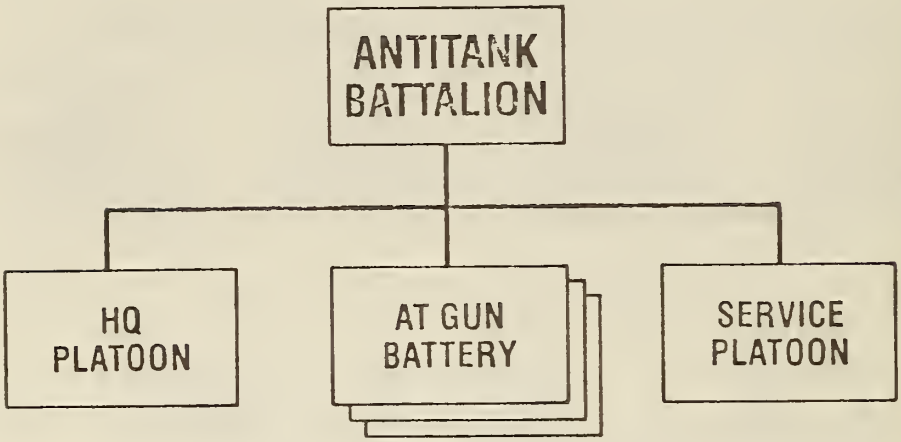
ARTILLERY REGIMENT
(Motorized Rifle Division)



	PERSONNEL			WEAPONS & EQUIPMENT																							
UNITS	OFFICER	ENLISTED	TOTAL	122 D-30/M-1974	152MM HOW D-1/M-1973	TRK	APC, BTR, BMP RADM	RADAR (CB)	SOUND RANGING SET	RADAR (Gnd Surv) GS-13	RADAR (MET) END TRAY																
REGT HQ	27	144	171			52	5																				
122mm HOW BN (2)	40	488	528	36		82																					
152mm HOW BN	20	244	264		18	41																					
TGT ACQ BTRY	12	90	102			7	1	1	1	1	1																
TOTAL	99	966	1065	36	18	182	6	1	1	1	1																

Figure II-7 - Organization of the MRD's Artillery Regiment

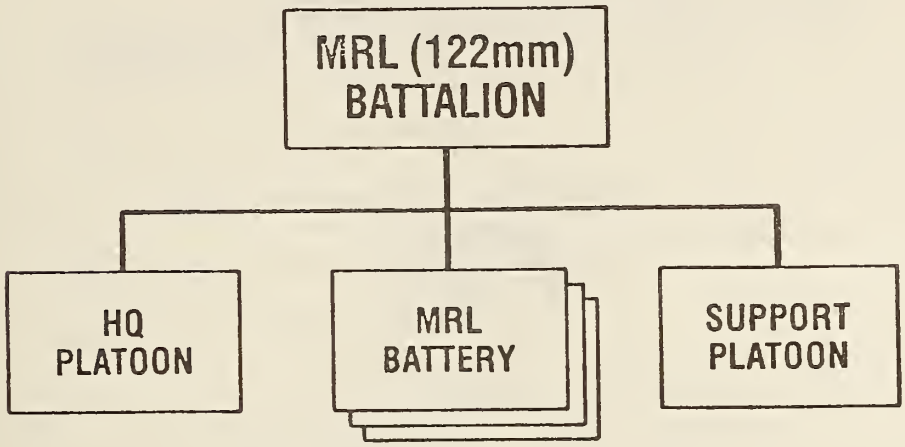
ANTITANK BATTALION
(Motorized Rifle Division)



	PERSONNEL			WEAPONS & EQUIPMENT																			
UNITS	OFFICER	ENLISTED	TOTAL	100mm AT GUN T-12	TRK	APC BTR BMP BRDM																	
BN HQ	6	25	31		9	2																	
AT BN (3)	15	180	195	18	30																		
SERVICE PLT	2	54	56		11	1																	
TOTAL	23	259	282	18	50	3																	

Figure II-8 - Organization of the MRD's Antitank Battalion

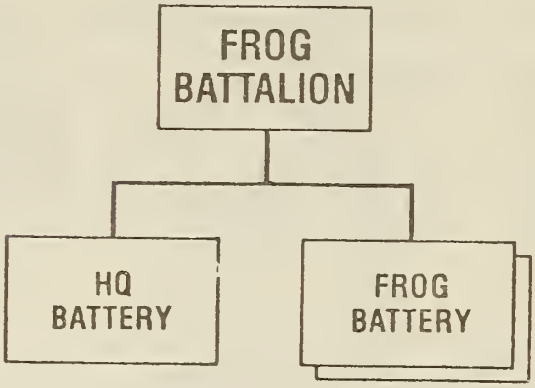
MULTIPLE ROCKET LAUNCHER BATTALION
(Tank and Motorized Rifle Divisions)



	PERSONNEL			WEAPONS & EQUIPMENT																			
UNITS	OFFICER	ENLISTED	TOTAL	122mm MRL BM-21	TRK	APC, BTR, BMP BRDM																	
BN HQ	7	24	31		9	2																	
MRL BTRY (3)	15	168	183	18	12																		
SUPPORT PLT	1	42	43		25																		
TOTAL	23	234	257	18	46	2																	

Figure II-9 - Organization of the MRD's Multiple Rocket Launcher Battalion

FROG BATTALION
(Tank and Motorized Rifle Divisions)



UNITS	PERSONNEL			WEAPONS & EQUIPMENT																				
	OFFICER	ENLISTED	TOTAL	TEL FROG-7	TRK	RADAR (MET) END TRAY	RADAR (MET) BREAD BIN	APC, BTR, BMP BRDM																
BN HQ	8	66	74		34			2																
FROG BTRY (2)	10	72	82	4	8	2	2																	
TOTAL	18	138	156	4	42	2	2	2																

Figure II-10 - Organization of the MRD's FROG Battalion

Tactical Air Support

In recent years, the Soviets have become increasingly aware of the benefits of supporting ground operations with air elements. While Soviet perceptions of the role of aircraft differ from ours, it is nevertheless estimated that by 1990 approximately 4,500 fixed wing aircraft and helicopters will be devoted to the support of ground forces.

Tactical Air Organization - Within the Soviet combat structure the air component which supports ground forces is referred to as Frontal Aviation. The key element of Frontal Aviation is the Tactical Air Army. The disposition of Tactical Air Armies and their evolution from a peacetime to a wartime footing occurs in the following manner:

- For command and administrative purposes, the USSR is divided into 16 military districts. In conversion to war footing, those military districts located in important border areas are designed to take the field as Fronts capable of independent military action.
- Outside the territorial borders of the USSR, there are forward deployed forces in commands referred to as Groups of Forces, e.g. the Group of Soviet Forces Germany. As with those internal military districts so designated, Groups of Forces are designed to operate as wartime Fronts.
- Each military district and group designated for wartime conversion to frontal status has at least one Tactical Air Army assigned directly to it. In this role, the Tactical Air Army is directly subordinate to the Front Commander. The commander of the Tactical Air Army also functions as Deputy Front Commander for air matters.

The Tactical Air Army - There is no fixed organization for the Tactical Air Army but a typical structure would be formed of a mix of:

- Air Divisions - The two types of divisions are fighter and fighter-bomber. A division will usually have three air regiments, but may contain from two to five.

- Air Regiments - The air regiment is the smallest unit having a headquarters and personnel establishment. Regiments are designated by role as: fighter, fighter-bomber, reconnaissance, or helicopter.

- Air Squadron - The squadron is the basic combat flight formation. It has four flights of three or four aircraft. Air divisions may include as attachments, certain types of independent squadrons, such as, Liaison, Transport, Evacuation, and Reconnaissance.

Control - As previously noted, the Front commander exercises direct control over the Tactical Air Army with the commander of that unit acting as his deputy commander for aviation.

- Down to division level, staff elements of the Tactical Air Army commander and the air defense commander of the ground unit are collocated. In conjunction, the two have operational control of anti-aircraft units, surface-to-air missile units, and fighter units.

- Air divisions or regiments may be placed directly under the command of Combined Arms Armies for specific operations, or the Combined Arms Armies may be allocated a certain number of sorties. In turn, sorties may be further allocated down to motorized rifle and tank divisions.

Coordination of Air-Ground Operations - Tactical air representatives, located at each ground force headquarters down to division, are active in combat planning in the following areas:

- Preparation of fire plans, which routinely include both air and artillery targets.
- Preparation of air defense plans.
- Preparation of safe passage plans for tactical aircraft operating within ground based air defense areas.
- In addition, air unit commanders routinely attend ground force operational and intelligence briefings.

Communications are maintained between ground force and air force headquarters which can carry motorized rifle or tank regiments' requests for air support. It should be noted, however, that these communications do not approach the responsiveness of air-ground communications in Marine Corps units. Additionally, the lack of any Soviet equivalent to the DASC or TACP greatly restricts the employment of aviation assets. Air-ground communications found in Soviet forces may be accurately described as rudimentary in nature and constitute a serious limitation in the utilization of air assets in support of ground forces.

Tactical Air as Component of Combined Arms - Soviet doctrine recognizes that highly organized coordination among air, ground, and naval forces is required to be successful in defending against amphibious assault. In this context, tactical airpower is fully integrated into the task of supporting the overall defense. Probable tactical missions for air include:

- Air Cover - Fighter units furnish air cover for specific units or over the geographic limits of operational areas.
- Air Superiority - The Soviets appreciate the advantage of being first to destroy or neutralize enemy air elements to achieve the status of air superiority; however,

they also believe that both offensive and defensive operations are possible without full air superiority.

- Support of Ground Operations - For the landing force, this mission represents the greatest threat from Soviet tactical aviation. However, inasmuch as the Soviets consider air strikes to be an extension of artillery fires, they place great emphasis on preplanned targets. This threat thus loses some of its significance in the fluid conditions of amphibious warfare.

Largely due to the lack of a responsive air-ground communications system, frontal aviation does not normally employ high performance aircraft to provide close support along the immediate line of contact. The most likely targets for high performance aircraft will be ships of the amphibious task force. In those instances when air elements are employed against the landing force, either ashore or in the water, the method of attack will be the engagement of targets of opportunity in the defense sector of a designated ground unit. Employed in this role, high performance aircraft are capable of engaging tanks, artillery, assault amphibians, and infantry with bombs, rockets, and machine gun fire. Ordnance will be varied among the aircraft of a given flight to permit the engagement of different types of targets.

With the increasing deployment of attack helicopters, it can be anticipated that *these will assume the major close air support role along the line of contact.* While the ATGM capability of these helicopters will be advantageous in attacking tanks and AAVs, their lack of any other armament beyond machine guns will limit their employment. Also, as with fixed wing

aircraft, the lack of adequate air-ground communications and control will prevent helicopters from being truly responsive to the needs of the ground commander. Recent news reports, though, indicate intensive efforts to improve this capability (Soviet and Afghan pilots have been operating about 50 armed helicopters against rebels in Afghanistan).

Air Defense of Ground Forces - The collocation of Frontal Aviation and Air Defense directorates, at each echelon, is designed to ensure cooperation between aircraft units and SAM and AAA units in accomplishing the following tasks:

- Air defense protection for deployed ground units.
- Safe passage for aircraft through the air defense envelope.

The air defense umbrella for ground forces is provided by SAMs and AAA, as well as by interceptor aircraft, netted together by radar warning and control facilities. Approximately forty percent of the aircraft assigned to Frontal aviation have the primary mission of protecting ground troops.

- Air defense interceptors are mainly of the all-weather type, equipped with search/track radar for target acquisition and fire control, as well as infra-red and laser sighting systems.
- Interceptors are scrambled on order of the air defense directorate.
- Direct control of aircraft is assumed by ground control intercept (GCI) radar at the designated outbound pickup point.
- Intercept may be accomplished by one, two, or a flight of four aircraft. Control of zones of responsibility may be made by setting a barrier at boundaries, or the

GCI controller may vary the speed of fighters during the intercept.

- Air defense interceptors may also be employed as a CAP for fighter-bomber operations in support of ground elements.

Soviet aircraft are generally less sophisticated and easier to maintain than their U.S. counterparts. Because of these characteristics, the Soviets theoretically can sustain a sortie rate of four or five missions/aircraft/day under favorable conditions. Actual sortie rates, however, are more a function of crew stamina and logistic support than of aircraft characteristics. Most Soviet planning documents indicate an expectancy of maintaining two to three sorties per day during the first three days of combat and one to two sorties daily thereafter. Friendly activity to degrade ground support facilities could reduce this figure significantly.

Engineer Support

As they do in all types of Soviet tactical operations, engineers play an important role in the defense against amphibious assault. The Soviets recognize that execution of combined arms operations on the modern battlefield will require the efficient performance of engineering tasks. This is especially true in the increased spatial scope of operations executed against amphibious forces. Given the emphasis placed on strongpoints as the foundation of the defensive plan, the role of engineers is vital.

Basic Engineer Considerations - Engineer support of a defense against amphibious assault will occur in two phases:

- Support when preparing for defense.
- Support during the conduct of the defense.

The individual tasks performed by engineer units during each of these phases can be broken down into four major areas:

- Field defenses.
- Obstacles.
- Route preparation.
- Deception operations.

Combat engineers (sappers) and engineer heavy equipment units organic or attached to the division will assist maneuver elements in the construction of field fortifications. *Armored vehicle positions will be constructed along with infantry fighting bunkers and weapons revetments as a first priority task.* Command, medical, supply, and communications positions will be assigned lower priorities.

Obstacles will be constructed by engineers or under their supervision. The division's antitank defense plan will be strengthened through the construction of antitank ditches and the improvement of natural obstacles in order to canalize friendly movement into areas of antitank weapons concentrations. Engineers will emplace or supervise the emplacement of minefields to include: anti-boat (landing craft), antitank, and anti-personnel minefields. Some antitank/anti-personnel

minefields will be laid in advance while others will be planned for emplacement as required.

Route preparation and maintenance is considered an important aspect of the defense. Not only must supply routes be kept open, but also routes for the movement of reserves and counter-attack forces must be ready when needed. Inherent to this requirement are such engineering tasks as obstacle breaching and removal, and bridge repair and emplacement. The Soviets envision these tasks as being conducted under fire.

Deception is the responsibility of all forces, but the engineers are responsible for the construction of dummy positions for all units. Additionally, engineers hold stores of dummy equipment for use in support of deception operations.

Specific Engineer Considerations -

- Engineer Reconnaissance
  - Location of natural means of camouflage.
  - Location and determination of the utility of natural obstacles.
  - Determination of road and bridge conditions within the defensive sector.
  - Location of materials suitable for use in fortifications.
  - Identification and determination of condition of water sources.
- Obstacles - The primary consideration in the planning of obstacles is the implementation of a system which is coordinated with the commander's fire plan and the presence of natural obstacles. Emphasis is on the creation of anti-tank obstacles.

Radioelectronic Combat Support (REC)

Radioelectronic Combat is the Soviet plan for accomplishing and integrating SIGINT, target acquisition, ECM/ESM, electronically supported firepower, and ECCM. The essence of REC lies in a planned sequence of activities that attempt to selectively deprive Soviet adversaries of control of the tactical electromagnetic environment. *REC is used to support tactical objectives in offensive operations, and will assuredly be encountered by amphibious forces.*

Recognizing that an opponent's ability to conduct combat operations will be seriously degraded if the opponent is deprived of tactical use of the electromagnetic spectrum, the Soviets feel that two tasks are critical:

(1) Neutralization of one-third of the opponent's emitters through jamming.

(2) Neutralization of an additional one-third of the opponent's emitters by suppressive fires.

In amphibious operations, it must be recognized that REC elements organic and attached to the division will attempt to perform these tasks against both the amphibious task force and the landing force.

Planning Activities - The initial task confronting the REC planner is the identification of communication "keystones" within the amphibious task force and the landing force. "Keystones" may be considered as those communication links upon which the command and control of friendly tactical forces and

weapons systems are dependent. The Soviets consider the following to be "keystones" in an amphibious environment:

- Air and naval gunfire nets
- Ship-to-shore tactical nets
- Artillery nets
- Landing force division, regiment, and battalion tactical nets.

As "keystones" are developed by Soviet planners, they are prioritzed according to their expected relative impact on the battle. The intent is to classify and prioritize friendly control centers, in essence delineating the friendly central nervous system so that it may be attacked electronically or by fire.

REC target priorities in an amphibious environment are generally:

- Naval gunfire, missile, and aviation units that possess nuclear capabilities, and their associated control systems.
- Command centers of the amphibious task force and landing force.
- Landing force artillery, tactical air, and air defense units limited to conventional weapons.
- Beachmaster activities and beach support areas.

A unique feature of Soviet REC is the relationship of electronic warfare and supporting arms elements. Certain tactical aviation, surface-to-surface missile, and artillery units will be given a direct support mission and respond to calls for fire from electronic warfare units. For example,

tactical aviation may attack amphibious command ships in response to calls from REC units, or artillery may fire on communication stations of the landing force in the same manner. This role of direct support of electronic warfare elements by air, missile, and artillery units is a combat feature found only in Soviet-style REC.

Conduct of REC Activities - The Soviets realize that it does little good to disrupt the communication links from battalion to regiment unless the data being transmitted is of such a time-valuable nature as to enhance Soviet efforts if disrupted. Accordingly, the employment of REC measures will occur at a time felt to be of greatest benefit to the Soviet. Generally, these activities will be conducted at times judged best to support:

- Artillery concentrations and barrages during the ship to shore movement.
- Maneuver of forces engaging heliborne/airborne units, or participating in counterattacks.
- Assisting in the defense of targets under air or naval gunfire attack.

As the battle progresses, REC elements may be expected to initiate *massive jamming of landing force low level tactical nets in an attempt to disrupt command and control among maneuver units*. The intent of such activity, coupled with the defensive fire plan, is to slow the battle and develop the opportunity to defeat the landing force in detail.

Impact of Threat on Battalion Structure

The discussion above was limited to an objective examination of a doctrinal Soviet organization as typical of many other potential enemy organizations. The value of this information is greater, though, when the threat capability is considered in relation to our own. This kind of evaluation provides a base for comparison of threat versus USMC capabilities and also permits a better appreciation of threat levels by reviewing them in familiar terms.

The purpose of this assessment is to identify threat strengths which must be balanced by corresponding USMC organizational strengths.

IIB. EMPLOYMENT IN THE EIGHTIES

Introduction

Consideration of the threat suggests that potential employment of the Marine infantry battalion could occur against any of several differently styled organizations. As figure II-11 indicates, the threat discussion mentioned the similarity between Soviet tactics and organization and those of several other communist nations. This similarity indicates that if the Marine infantry battalion is to be employed against Soviet or Soviet-like forces, the nature of the confrontation will be similar to that described in the intelligence assessment (section IIA). Unfortunately, however, a threat description can

not indicate whether employment against a Soviet or Soviet-like force is more or less likely than employment against some other type of force. This uncertainty is troublesome because it deprives us of the advantage to be gained by designing a battalion to counter the "most likely" threat.

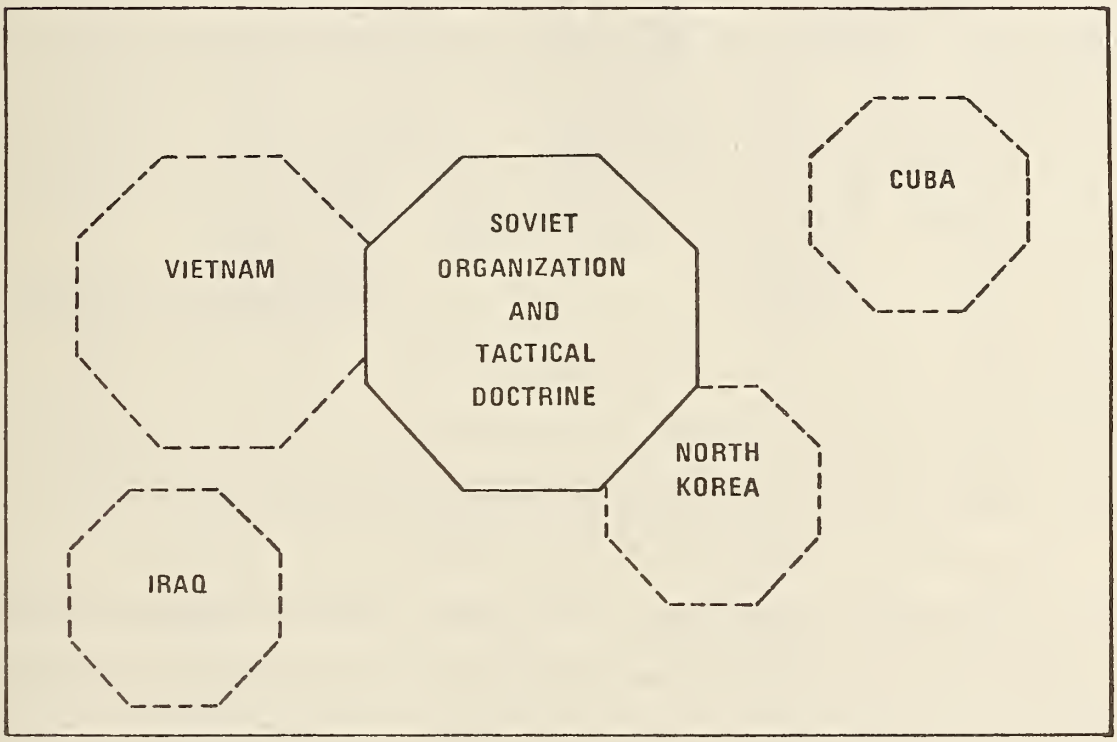


Figure II-11 - Soviet and Other Communist Countries Share Similar Military Doctrine and Organization

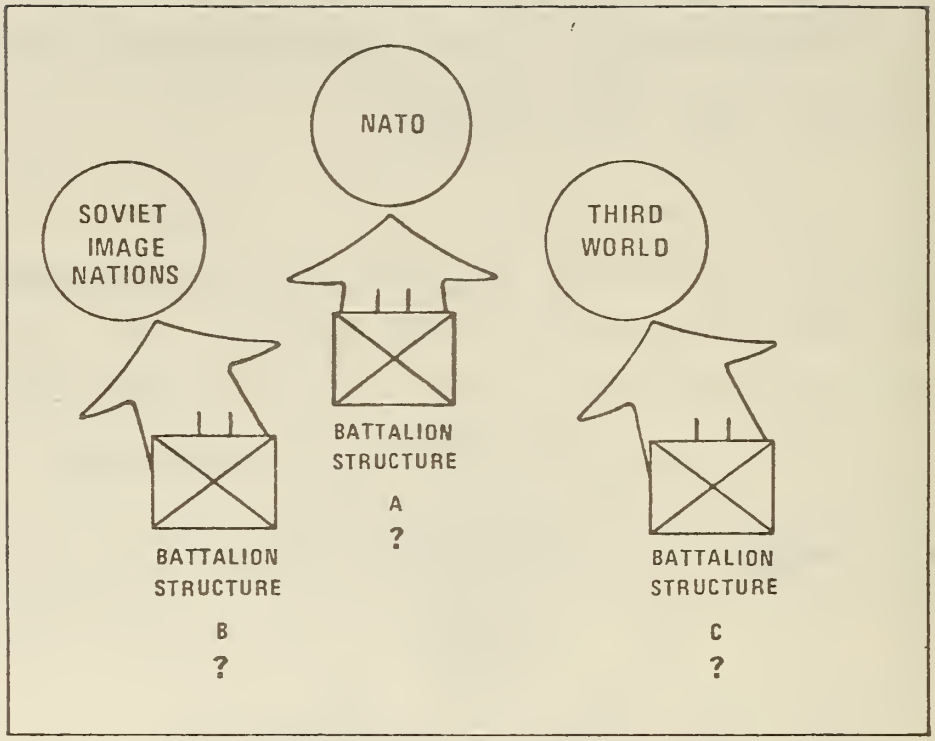


Figure II-12 - Several Different Structures Are Indicated By Different Threat Scenarios

To further illustrate this point, three prominent areas of concern are the NATO scenario, a crisis involving a Soviet-like nation, and a third world involvement. As is indicated by figure II-12, three slightly different battalion structures would be able to respond in the best manner to each of these possibilities. But the creation of several different Marine infantry battalion organizations would be extremely inefficient. This fact emphasizes the same uncertainty as was previously mentioned, namely, against which threat should we balance the battalion?

An answer to this question was sought because it provides a large part of the design philosophy needed for this project. The answer is more a suggestion than a solution, but it can be stated as follows, "Ensure an adequate capability to meet the most likely threat without sacrificing the flexibility needed to adjust to other requirements." In other words, *USMC infantry battalion structure should be designed so that all likely contingencies can be met, but the combat power needed for the most likely contingency should be paramount.* In order to estimate the range of combat power that must be preserved according to this philosophy, some attempt to identify the most probable type of future employment was therefore required.

Consideration of Trends

Much published information exists on the subject of trends in the use of military force by the United States. The conflict analyses are sufficiently detailed and current that further research was not required on this subject. Review of existing literature was fruitful. Of the many sources available to the study team, two reports were of the most assistance. These are referred to throughout this section as the Army War College Study[1] and the Center for Naval Analyses (CNA) study.[2]

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[1]U.S. Army War College, Strategic Studies Institute, An Analysis of International Crises and Army Involvement, (Carlisle Barracks, Pennsylvania: Army War College, 1974).

[2]R.P. Richardson, "An Analysis of Recent Conflicts," Report of Center for Naval Analyses Research Contribution No. 144 (Arlington, Virginia: CNA, 1966).

One of the objectives of the Army War College study was "to determine which types of crises have occurred with greatest frequency and where they have occurred."[3] In pursuit of this goal, the study team examined more than a hundred conflicts which erupted from the end of World War II until 1974. From this large list, twenty-eight specific crises were selected based on their fulfillment of the following conditions:

- International situation
- Required U.S. decision on use of military force
- Either combat or demonstration of strength.

The crises which were selected spanned a time line from 1946 (Iran and Turkey) to 1973 (Yom Kippur).

The CNA study did not include as recent a list of conflicts as did the Army War College effort, but what the CNA team lacked in currency they more than made up for in volume and detail of analysis. The CNA study analyzed 380 conflicts which were initiated during the years from 1946 to 1964. Among their aims was the development of a data base to support conclusions as to the likelihood of similar crises in the future. The trend data which the CNA report forwarded constitute a thoroughly constructed image of the history of U.S. international involvement in the modern period. Through the tool of statistical analysis this

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[3]Army War College, p. 2.

historical perspective was then used to support conclusions by the CNA study team. The rigor with which they accomplished these analyses allowed the present (Marine infantry battalion) study team to be confident that our independent conclusions were firmly based.

Conclusions

One of the first observations to be made from review of the two conflict analyses referred to above, and some others, was that there is a fairly significant commonality of interest, as figure II-13 shows, in the same international crises between

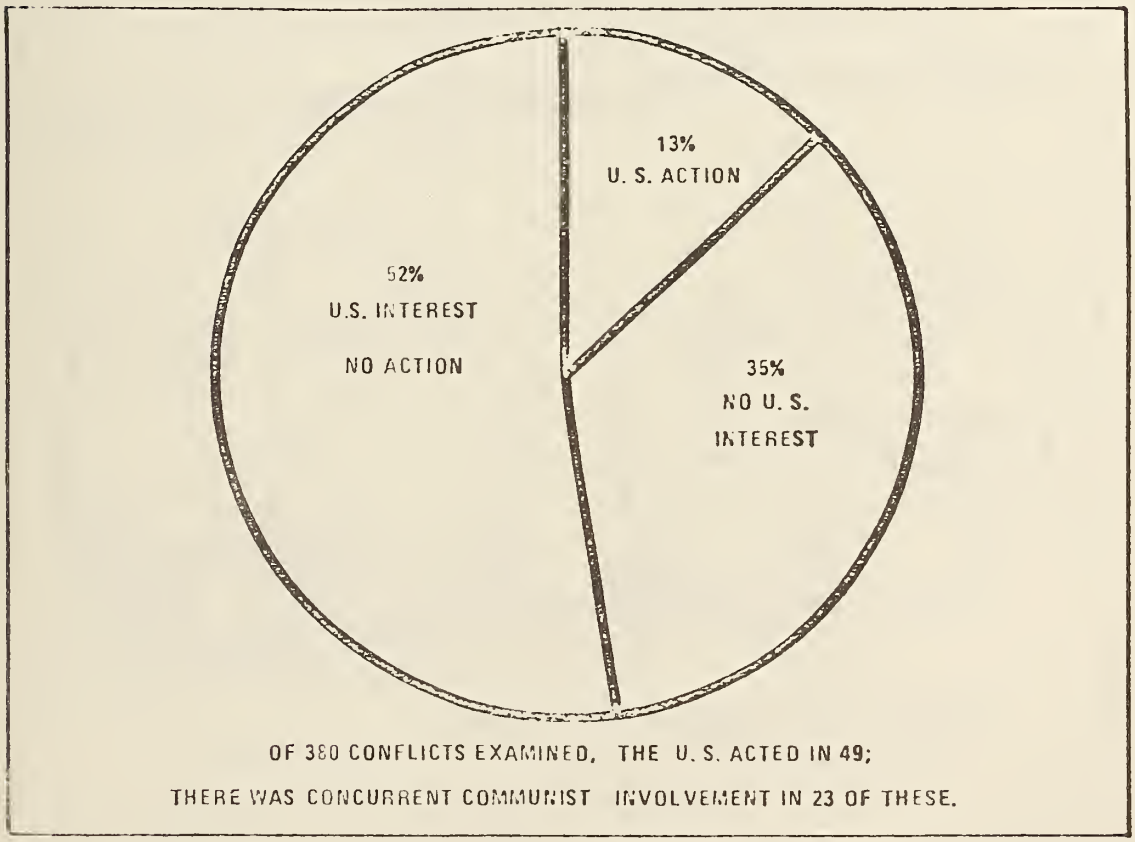

Figure II-13 - U.S. Interest in International Crises

the U.S. and the USSR. Although the U.S. does not become actively involved in every international crisis, it is important to note that the Soviet Union also becomes involved in a large percentage of those very same crises in which we do choose to act.

What is even more interesting about the commonality of U.S.-USSR interest is that it is geographically, as well as numerically, similar. Figure II-14 depicts regional interest; the

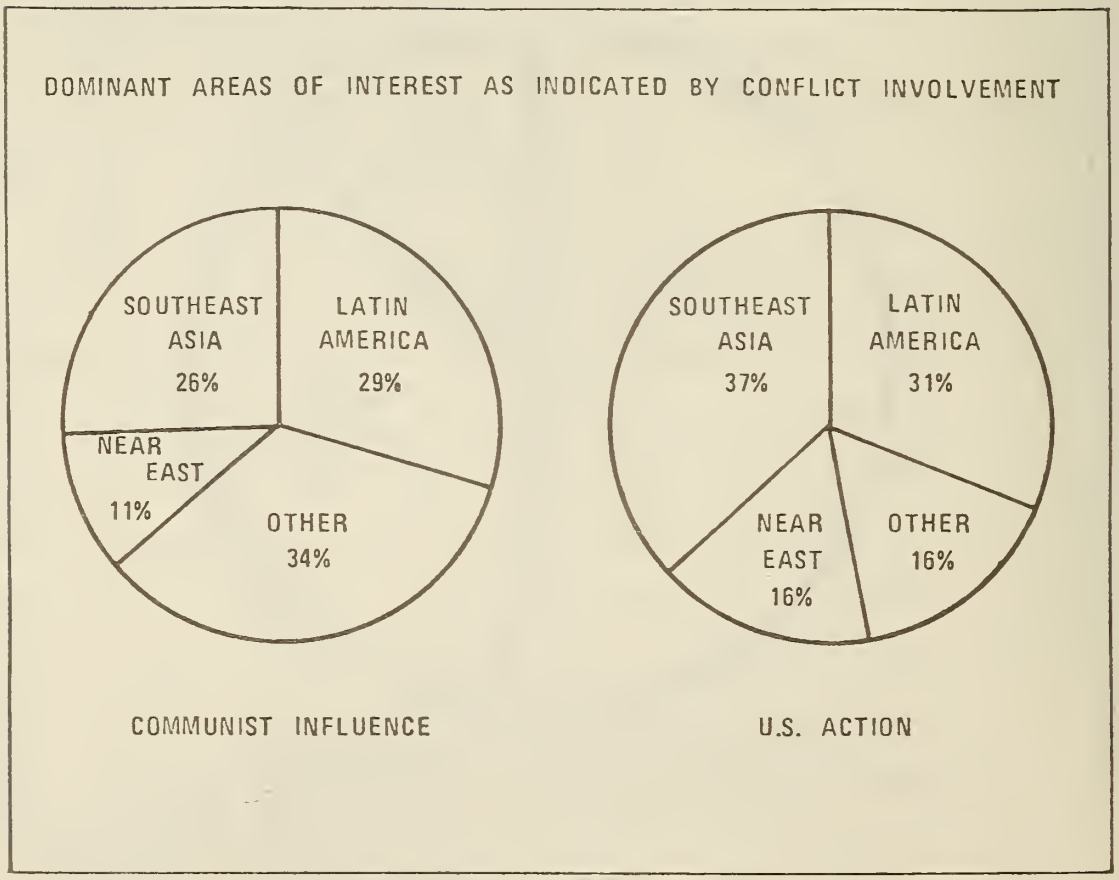

Figure II-14 - Mutual U.S. - USSR Interest by Region

similarity in degree of attention paid to Southeast Asia, Latin America, and the Near East is striking. Although the occasions in which there was simultaneous involvement are fewer than the numbers of individual involvements suggested by figure II-15, it is clear that total conflict involvement is regional, with the U.S. and USSR both showing strong interest in Latin America, Southeast Asia, and the Near East. In simple terms, this historical perspective indicated that the U.S. and USSR are traditionally interested simultaneously in international conflicts which take place in the same or nearby areas.

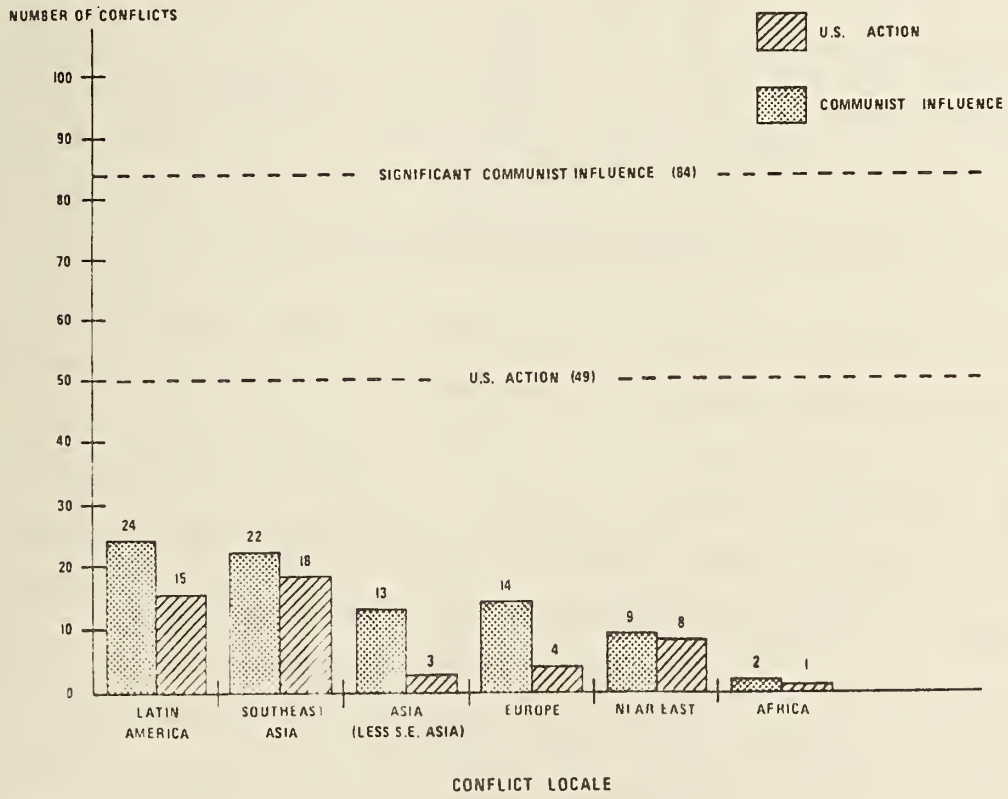

Figure II-15 - U.S. - USSR Involvements in Conflicts

This common pattern of regional involvement hints at the likelihood that mutual U.S. - USSR interests are characteristic of modern conflict(s) and, therefore, probably will continue. This trend supports the conclusion that likely adversaries in the eighties will be representing the USSR side of this U.S. - USSR common interest and, therefore, will be organized, equipped, and trained to fight along the lines discussed in the threat assessment portion of this report.

Another major concern in structure philosophy stems from the Marine amphibious mission. Once more, a trend can be inferred from historical involvements. By determining the distance in nautical miles from the initial site of each conflict examined to the nearest sea access, it became apparent that a significant percentage of international conflicts have been easily accessible by sea. Figure II-16 summarizes the results of the CNA study in this respect. By way of validation, it is also noted that more than 80% of the crises considered by the Army War College study were in countries to which the United States had access by water (24 of 28 studied). In three cases, only air access was possible, while in one case (Czechoslovakia, 1968) land avenues were the only ones considered open; four of the countries accessible by water could also have been reached by land. The trend discernible from these considerations is clear: American involvement in modern international crises

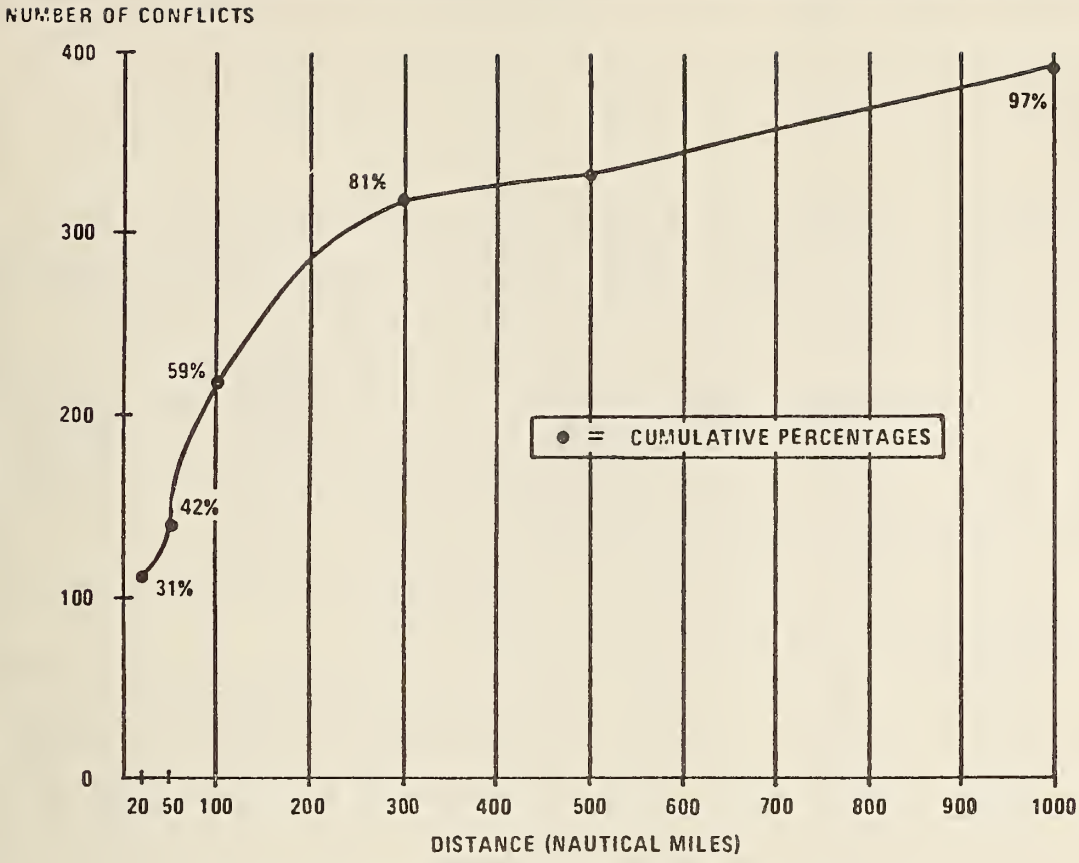

Figure II-16 - Recent Conflicts Relative to Sea Accessibility

has largely been in areas suitable for the employment of amphibious forces. Extending this trend forward, then, allows a reasonably clear conclusion that a large number of future conflicts are likely to be similarly located.

In light of the Marine Corps' amphibious role and tradition, the inclusion of an amphibious capability as part of structure philosophy might seem trivial. This would be a fair comment, in fact, if amphibious warfare as we have known it continues to characterize amphibious warfare of the future. There are

indications, however, that this is not to be the case. As a matter of fact, a recent study succinctly forecasts the amphibious flavor of the future in one simple sentence: "Most of the world's major cities are ports."[4] In amplification of that comment, figure II-17 summarizes the urban character of major geographic areas, worldwide.

Military Operations in Builtup Areas (MOBA)

Expanding the observation that close linkage exists between amphibious and urban locales, several highlights from the USMC Urban Operations study had to be considered before actual structure requirements associated with maintaining an amphibious capability could be identified. Much of the following discussion is extracted from that study.

With the advent of mobile warfare after World War I, military theorists and tacticians paid more attention to avoiding urban battlefields than in developing techniques for operating in them. In recent years, though, interest in MOBA has been renewed as a result of three key factors:

- Critical national assets of most countries, e.g., rail and roadway hubs, seaports and airports, communications nodes, centers of culture, and political power, continue to be highly concentrated in and around urban areas.
- Worldwide urbanization and industrialization, especially along the littorals, have altered the potential combat "terrain" so extensively that military operations in and

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[4] Concepts of Operations for the Landing Forces in Urban Environments During the Mid-Range (Quantico, Virginia: Concepts, Doctrine, and Studies Activity, Development Center, MCDEC, 1977), I, p. 4-42. Hereafter cited as USMC Urban Operations.

Area	Amphibious Accessibility	Characteristics	Nature of Urbanization
Southeast Asia	Significant	Virtually all capitals and major cities are seaports or in close proximity to sea; only Laos is landlocked.	Progressing rapidly
Middle East/Africa	Significant	All countries are accessible from the sea.	Arid climate makes cities focal point for all activity.
Europe	Significant	No major power is landlocked.	Intense and complex urbanization.
Latin America	Most vital areas accessible	Most capitals and important cities are ports.	Progressing rapidly.
Far East	Significant	Only Mongolia is not accessible from the Sea.	Dense urbanization in Japan and parts of China--other areas developing.
Sub Sahara Africa	Inaccessible	Fourteen countries are landlocked.	South Africa very modern and intensely urbanized--rest of region developing.
South Asia	Many areas	Afghanistan and many developing countries not accessible but most major ones are.	Severe overcrowding in very large cities and developing urbanization.

Figure II-17 - Relationship Between Amphibious Accessibility and Urbanization[5]

[5] USMC Urban Operations, pp. 4-27 to 4-36.

around urban areas now appear unavoidable rather than tactically bypassable. Recent demographic studies indicate:

- Urban population growth in both developed and undeveloped countries has been even more rapid than the publicized world population increase. The world population is projected to increase from 30 percent urban in 1950 to 50 percent urban by the year 2000. Metropolitan areas in industrial countries are spreading to encompass vast regions in some countries and, in western Europe, even between countries.

- Most of the large, growing, urban areas of the world are located along or within 10 miles of the coastline. This explosion of metropolitan development around the world will make it increasingly difficult to avoid urban areas even during critical amphibious operations.

- The alarming increase of terrorist activities worldwide is expected to continue into the future, evolving to the extent that urban unrest, even in emerging nations, will be more common than rural insurgencies.

These factors combine with the results from conflict analysis to support a conclusion that the ability to conduct urban operations is a logical corollary to amphibious capability. As more and more of the world's littorals become characterized by urbanization, the likelihood that Marines will be required to operate in a MOBA environment becomes more certain. A brief description of this environment helps to point out structure changes which would enhance the MOBA potential of the Marine infantry battalion.[6]

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[6] USMC Urban Operations, p. 7-24.

To meet the urban challenge, Marine small-unit leaders must assume a semi-independent role. Because of the decentralized nature of urban conflict, companies, platoons, and in some instances squads will be reinforced or specially organized. The nature of the reinforcement or task organization in the attack will depend heavily upon the type of structures found in the various sectors of the urban area.

Man-portable weapons are a necessity to small autonomous infantry units operating in urban combat. These weapons are used to attack tanks at the vulnerable sides, rear, and top and to penetrate hardpoints to defeat defensive positions and provide man-sized entry breaches. Shaped-charge warheads optimized against the armor threat are not truly effective against masonry or earth/timber defenses. High explosive warheads are needed to defeat these defensive targets. In the absence of such weapons, Marine infantry units must satisfy breaching requirements with demolitions or through fire and arming distances of organic weapons. Furthermore, the TOW and DRAGON each need a 3.5 foot clearance along their lines of flight to prevent wings and control surfaces from becoming hooked on some object and being deflected.

In some sectors, company and platoon commanders will not have visual contact with their subordinate elements and will not be able to directly influence their actions. For example,

when operating in block-long, multi-storied buildings, platoon, company, and battalion commanders can do little to assist successive attacks by their units. Attacking infantry movement will consist of advancing through buildings and interior walls by breaching, if necessary, and over rooftops or through underground systems such as sewers, subways, and utility conduits. Area defense in an urban environment is built around infantry defensive strongpoints in depth with mutually supporting fires.

Snipers are especially useful in both offensive and defensive urban operations. Snipers will not prove to be decisive in the outcome of an urban conflict but do, when effectively employed, seriously affect the morale and leadership of the troops involved.

In addition to the MOBA requirements discussed above, the study included the following pertinent findings, some of which are correctable by structure design (if validated by other tests/analyses).[7]

- Current Marine Corps tactical radios are inadequate for the small unit, semi-independent operations characteristic of MOBA.
- Reconnaissance activities, such as reconnaissance patrols and recon-in-force, are both more difficult and more important in urban than in rural operations. The restrictions on mobility and line of sight make present ground tactical reconnaissance techniques inadequate for MOBA.

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[7] USMC Urban Operations, ch. 9.

- Similarly, current ground surveillance devices are of limited utility in densely urbanized areas because of line-of-sight limitations.
- Antimechanized operations are seriously constrained in MOBA as a result of weapons characteristics, i.e., arming distance, flight path clearances, and backblasts.
- Nonlethal chemical munitions are more valuable in MOBA than in other types of operations.
- There are no weapons currently available to the infantry battalion with a breaching capability and current techniques for breaching require hand placement of charges against targets.

In summary, the likelihood of Marine infantry battalion amphibious operations carries with it an implied likelihood that MOBA operations will also be required. Some of the special requirements for MOBA are dependent on the introduction of a suitable assault weapon(s) into the USMC infantry inventory, but others are amenable to structural solution. Some which must be considered are *the usefulness in MOBA of the sniper*, the requirement for small unit activity in MOBA with its attendant *command, control, and leadership* implications, and the increased *need for reconnaissance and/or intelligence functions*.

IIC. IMPACT OF TECHNOLOGY

Introduction

The word technology directly implies "hardware." But military men are acutely aware of the fact that military hardware alone rarely achieves combat success unless it is tied to

appropriate organizations and tactics. Organizations and tactics, therefore, must be viewed in relation to the state of technology at the time they are to be employed. For this reason, the optimal infantry battalion of the eighties must be designed today to most effectively team its structure and tactics with the technology of the eighties, as portrayed in figure II-18. Having already considered where and against what (type of) forces Marines are likely to be employed throughout the eighties, attention now turns to an examination of the battlefield on which Marines may fight as it will look from the hardware standpoint.

General

The state of technology throughout the next decade has strong bearing on organizational questions. Technological advances in weapon systems, for instance, can in turn cause new tactics to emerge (e.g., nuclear weapons). To examine these interactions between the technical characteristics of advanced weapons systems and their tactical employment, the Defense Advanced Research Projects Agency directed an Advance Employment Concepts study. In a report on a portion of this study, the Rand Corporation[8] disclosed a number of conclusions, including the following:

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[8]E[dwin] W. Paxson, M.G. Weiner, and R.A. Wise, Interactions Between Tactics and Technology in Ground Warfare, A Report Prepared for Defense Advanced Research Projects Agency (Santa Monica, CA: The Rand Corporation, 1979), p. vi.

THRUST OF TECHNOLOGY – 1980's

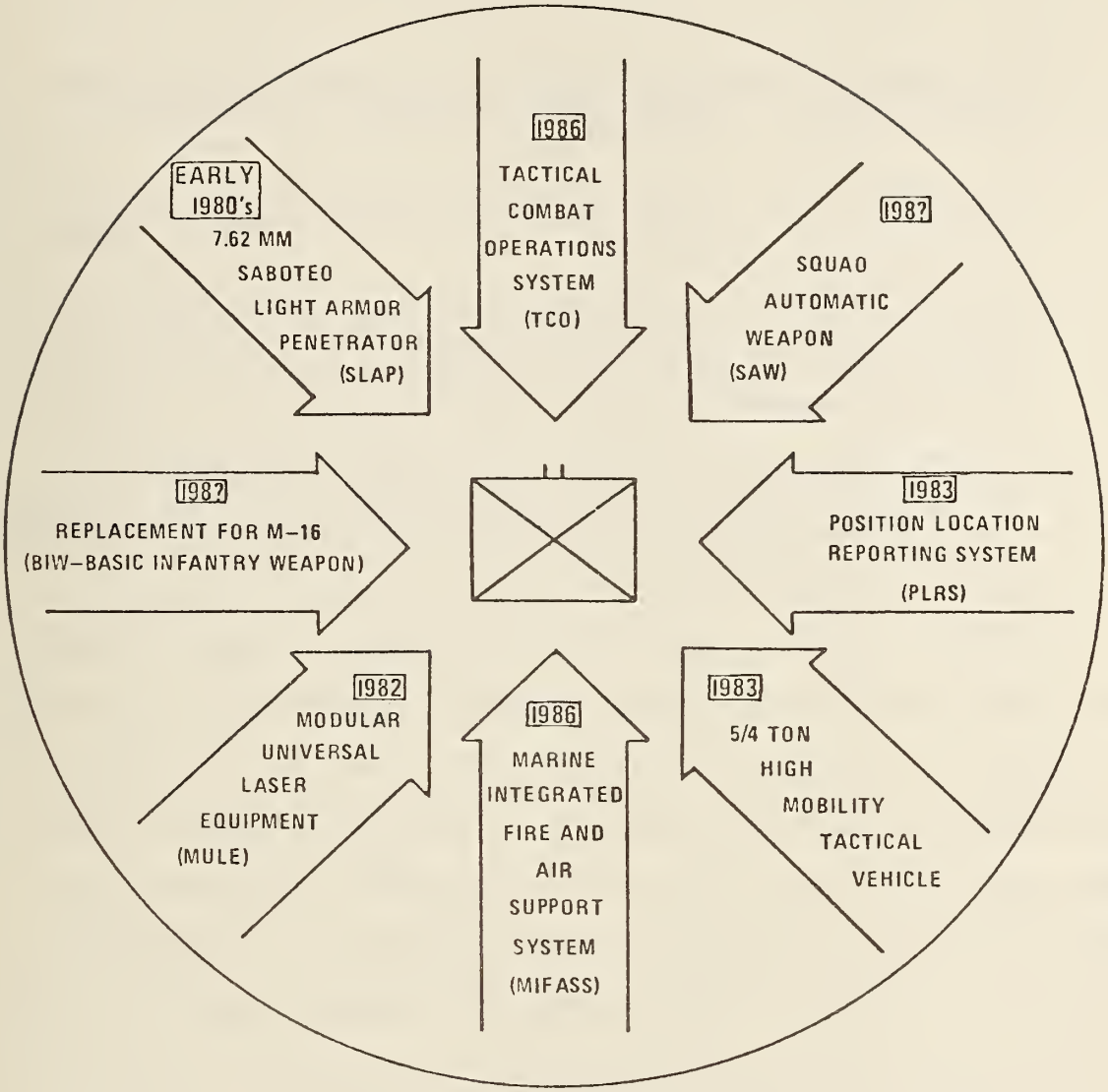

Figure II-18 - Impact of Technology on the Infantry Battalion of the Eighties

- Increased lethality, mobility, and target acquisition capabilities of modern weapon systems will produce a *high intensity of combat.*

- To reduce their vulnerability to improved weapons, and concomitant with their own improved firepower, *combat units will be smaller.*

- *Firepower must be maneuverable* as improved target acquisition and precision delivery make it more effective to concentrate firepower from supporting arms than to shift the positions of combat units.

- Combat operations and *force structure must be adjusted* in conjunction with technological and/or tactical changes, i.e., forces must be structured to increase their chances to exploit tactical/technological innovation and to limit their vulnerability to it.

Implied in these, and other speculations by Rand is a picture of the battlefield not unlike that suggested by the threat discussion. Combat units will be able to apply firepower much more efficiently and this precision, linked with improved target acquisition means, will result in smaller tactical units which will have to rely on maneuver and massing of supporting firepower to build the mass needed for success in combat. This maneuver warfare will possibly result in a battalion commander controlling terrain through the placement and movement of "widely dispersed, relatively small units, distributed both laterally and in depth"[9] to capitalize most effectively on the technology of the eighties through the use of modernized tactics of the eighties.

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[9]Paxson, et al., p. 37.

This picture of maneuver warfare with its high premium on mobility, maneuver, and target acquisition indicates strong favor for *structuring an infantry battalion of the eighties with as much tactical mobility as is practicable.*

Specific

A precise picture of the hardware developments likely to affect the infantry battalion before 1990 is impossible, since equipment introduction is a long and somewhat uncertain process. Although dates for the introduction of improved capabilities are projected for all equipment requirements, they are often too inaccurate for several reasons to permit certainty in forecasting. We can, however, synthesize from a variety of sources a fairly reliable picture of the technological so far as the infantry battalion is concerned. Review of current literature supports the conclusion that technological developments will most strongly affect the Marine infantry battalion in the areas of firepower, command and control, logistics services, and target acquisition.

Firepower - The most notable contributions in the realm of infantry battalion firepower will come from improved mortars, additional automatic small arms firepower, and the return of an assault weapon capability. Below is a brief description of the infantry weapons developments forecast for the next

decade; a more complete discussion may be found in the Weapons Systems portion of this report.

- Squad Automatic Weapon (SAW) - lightweight, one man automatic weapon capable of delivering a large volume of automatic, lethal, accurate fire; replacement for the M16A1 in the automatic rifle mode. Four candidates are currently being evaluated.

- Light Weight Company Mortar System (LWCMS) - Replacement for the M19 60mm mortar. A highly portable system with a weight of only 18 pounds in the handheld mode, but requiring a fire direction center for most desirable employment. Its light weight makes it an excellent assault weapon for use by maneuver elements.

- Assault Squad Weapon - A crew served, multipurpose assault weapon which is expected to replace the M202A1 Flame Weapon in 1985. This lightweight, reusable, fiberglass launcher will include an assault round in its ordnance inventory. The two man crew consists of a gunner and an assistant gunner/ammunition man.

- Improved DRAGON - A product improvement program being considered for the DRAGON would improve performance but increase the weight of a round of ammunition to 30 pounds.

Another anticipated weapon system that, although not projected to be organic to the infantry battalion, will have great impact on the Marine infantry function is the mobile protected weapons system (MPWS). The MPWS is envisioned as a lightly armored, mobile assault weapon with an anti-armor capability. Although not currently envisioned as a tank killer, it will possess adequate punch to engage tanks and damage most, with the ability to engage and kill other (i.e., non-tank) armor. The MPWS will be helicopter transportable with the CH-53E helicopter, thus further increasing its mobility and versatility. An initial operational capability is forecast for 1988.

The MPWS portends to be a vital ingredient in the Marine Corps recipe for maneuver warfare and as a damper to the maneuver and massing threat of potential enemies. In order to best capitalize on this powerful mobile assault weapon, the Marine infantry battalion must be organized to further enhance its already proven capacity for rapid and effective task organization to increase mobility when the situation demands.

Command and Control - The introduction of Marine Tactical Command and Control Systems (MTACCS) components to the infantry battalion is planned to occur during the eighties. These systems and their contributions, are discussed in detail in the Command and Control section of this report. The following summary paragraphs provide only the general characteristics of the systems most likely to be available to the infantry battalion commander.[10]

- Tactical Combat Operations System (TCO) - Assistance to commander in combat operations planning, monitoring, and coordinating. Permits the passage of information in near real-time between different MTACCS subsystems. By displaying selected data from several sources, the TCO will become the focal point for command and control functions.
- Marine Integrated Fire and Air Support System (MIFASS) - Performs one of the most critical day-by-day functions (coordination and control of combat support firepower) of ground combat and combat support commanders from the MAF to infantry battalion and artillery battery levels. MIFASS equipment will be used to automate the functions

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[10]Summarized from Marine Tactical Command and Control Systems (MTACCS) Master Plan, enclosure (1) to Commandant of the Marine Corps letter CCP-11:pmb, 3510/1, dated 25 September 1978, pp. 2-4 to 2-12.

now carried out by fire support coordination centers (FSCC), fire direction centers (FDC), and direct air support centers (DASC).

- Position Location Reporting System (PLRS) - Obtains position location information on ground and aviation units. Computer location data precisely enough to be used for automation of fire support functions. PLRS information will be used by TCO, MIFASS, and other MTACCS subsystems, and can also be used as a reliable navigation aid for persons, vehicles, units, and aircraft. Furnishes the infantry battalion commander, and others, with real-time location data on subordinate elements and adjacent and higher units.

- Marine Integrated Personnel System (MIPS) - Will use selective automation to improve the efficiency of the manpower management process. Both expeditionary and garrison usage is contemplated.

- Marine Integrated Logistics System (MILOGS) - Will most likely share operating equipment with MIPS to upgrade the efficiency and capability of today's logistics systems. Also to be the combat service support commander's command and control system.

Logistics Services - The major impact of technological development on the logistics of the infantry battalion will probably be in the form of the 1 1/4 ton truck. A 1977 review of the tactical motor vehicle mix in the Marine Corps showed that 1982 would signal the end of the expected life of most vehicles in our fleet. Cost considerations prevented one-for-one replacement and forced a re-examination of future requirements. One result of this process was a decision to standardize the vehicle fleet as much as possible by reducing the variety of vehicle models. In the infantry battalion, this means that all

configurations of M151A2, M880, and M561 vehicles will be replaced by the 5/4 ton high mobility truck.

The 5/4 ton truck has an initial operational capability date in fiscal year 1983, with a total quantity of nearly 10,000 eventually planned. This highly mobile vehicle is intended to replace the ambulance, the scout patrol vehicle, the forward observer vehicle, personnel transport, weapons carrier, and utility truck, with the same basic chassis.

Target Acquisition - Modular Universal Laser Equipment (MULE) is expected to enter the Marine Corps inventory in 1982. MULE will have both a handheld and tripod-mounted configuration, will be man portable by two Marines during sustained foot mobile operations, and is intended for use in designating targets for laser guided bombs, the Copperhead, 5-inch naval gunfire, and the Laser Maverick. This device for improving the probability of a first round hit on artillery, naval gunfire, and close air support targets meshes very neatly with general expectations of increased lethality as a characteristic of the future battlefield. The potential advantages, and probable uses, of this system made its consideration for inclusion in Marine infantry battalion structure timely and necessary.

IID. SUMMARY OF SECTION II

Several apparent trends in American involvement in modern international conflicts were considered. It was concluded that

there is a pattern which indicates a greater likelihood of USMC infantry battalion employment in the 1980's against a Soviet or Soviet-like adversary than against one otherwise organized. Furthermore, a review of post-1946 crises showed that a significant number of them occurred in areas accessible to U.S. forces by sea. The affinity between amphibious accessibility and MOBA along with these two conclusions favor the design of the USMC infantry battalion of the eighties around a sufficient amount of combat power to face a Soviet-like opponent in an amphibious setting, and to have the flexibility for almost-certain MOBA as well as other specialized operations.

To define the elements of combat power needed to face such an opponent, a review of current intelligence sources was performed. This assessment identified the strong points of the Soviet/Soviet-like organizations anticipated during the 1980's. These threat capabilities suggested several features which must be considered in designing an adequately forceful Marine infantry battalion.

Threat capabilities that required corresponding USMC structure or other actions included: maneuver, firepower, engineer, aviation, and radioelectronic combat potential.

The likelihood of amphibious and urban operations calls for structural consideration of logistics (both MOBA and amphibious), command and control, special firepower needs, and intelligence and/or reconnaissance elements.

In addition to threat capabilities for the eighties, the impact of U.S. technological developments were also considered. Some of the technology expected to be implemented in military hardware throughout the next decade will dampen the effect(s) of certain threat strengths, but the remaining threat capabilities will require counterbalance through modifications in structure.

The remaining portions of this report address the findings and conclusions of study efforts regarding these counterbalance issues.

III. RESULTS OF ANALYSES

As the discussion of general methodology in Section I indicated, several independent analytical efforts were undertaken throughout the duration of the study. This section of the report summarizes the results of most of them. Analyses which, although often time consuming, did not produce new or useful information are not documented in this portion of the report; several computer runs of the Amphibious Warfare Model fall into this category.

For the most part, the analyses reported on the following pages were conducted by Marines. In some cases where extremely specialized or technical support was required, outside assistance was obtained either from Marine Corps or other Department of Defense sources, or through contractual arrangements as necessary. Of great assistance were the members of the Systems Analysis Branch of the Concepts, Doctrine, and Studies Activity, Development Center, who aided in all phases of analysis. Other Development Center activities provided much support as requested and were especially helpful in projecting future weapons, systems, and equipment status. The U.S. Army's Ballistics Research Laboratories at Aberdeen, Maryland furnished much of the information reflected in section IIIC. The Marine Corps Operations Analysis Group of the Center for Naval Analyses did much work in support of all analysis, and especially section IIID. Contractor assistance was sought to obtain the computer model for

evaluating organizational effectiveness (Science Applications, Inc.) and for computer generation of the line-of-sight data needed in the Marine-developed wargame (Potomac General Research Group).

This section of the report is organized into six separate portions, to describe the results of the following analytical activities:

A - Organizational Effectiveness

B - Wargaming

C - Weapons Systems

D - Nuclear Vulnerability

E - Command and Control

F - Logistics

IIIA. DEGRADATION AND RECONSTITUTION OF COMBAT EFFECTIVENESS

Introduction

It was determined early in the course of the study that a thorough bottom-up examination of the infantry battalion was necessary. This analysis began with the rifleman and progressed upward to include consideration of fireteams, crew served weapons teams, squads, sections, platoons, and companies (including H & S Company). In all, eight different modules or subsystems within the battalion were considered in great detail.

The battalion was studied by making independent examinations of each of the following infantry unit/function modules:

- *Rifle platoon attack (sustained)* - the personnel and materiel capacity of a rifle platoon conducting constructive offensive operations against a series of company level intermediate objectives over a thirty day period. This was considered to require continuous performance of fire, maneuver, and command and control activities.

- *Rifle platoon attack (surge)* - the personnel and materiel capacity of a rifle platoon conducting a daylight frontal assault against a company level objective over a twelve hour period. This was considered to require fire, maneuver, and command and control activities at a higher stress level (but for a shorter duration) than for sustained operations.

- *Weapons platoon attack (sustained)* - the personnel and materiel capacity of a weapons platoon providing general supporting fires to the forward maneuver elements of a rifle company conducting offensive operations against a series of company level intermediate objectives over a thirty day period. The platoon's requirement to provide supporting fires, to maneuver, and to communicate was considered.

- *Weapons platoon attack (surge)* - the platoon was considered to be providing general supporting fires to the forward maneuver elements of a rifle company conducting a final assault on a company objective. The platoon had to fire and communicate, but not maneuver in this examination.

- *Rifle company attack (sustained)* - the potential of the rifle company to perform fire, maneuver, and command/control activities against a series of assigned objectives over a thirty day period. Previous analyses of the rifle platoon provided the input data on fire and maneuver elements.

- *Reinforced rifle company attack (sustained)* - this examination repeated the previous one but the rifle company was augmented with forward observers, a tactical air control party, and DRAGON antitank weapons.

- *Weapons company attack (sustained)* - the capacity of the weapons company to furnish fire and antitank support to three rifle companies in offensive activities over a thirty day period was considered.

- *Headquarters and service company attack (sustained)* - using the previous analyses of the rifle and weapons companies to describe battalion demands for maneuver and fire support, the H & S Company's capacity to support thirty days of offensive operations was examined.

This degree of analysis was undertaken because the reduction from traditional infantry battalion size to 900 was significant, at least in terms of numbers. This fact led to much concern as to the adequacy of a smaller battalion, once committed to combat and degraded by personnel casualties, to carry out its required activities. It was determined that in addition to examining each individual billet within a battalion, and its relationship to every other billet, there was also a need to estimate the impact on unit effectiveness of casualties occurring to each billet. Furthermore, since certain billets were

more or less characterized by special weapons or equipment, it was also important to explore organizational effectiveness in terms of equipment losses as well as personnel casualties.

General Approach

The selection of a technique for assessing the impact of casualties on an organization was considered at length. It was determined that mere quantitative considerations would be inconclusive and that the linear properties of attribution as a measure of combat power were questionable (for instance, the fact that a unit might have received thirty percent casualties would not support a logical inference that the same unit was conversely only seventy percent effective). It was decided that a truer measure of the impact of casualties on battalion effectiveness was in the area of recoverability. Specifically, a battalion's potential to regain a measure of its effectiveness after receiving casualties appeared to be affected by structure. Thus, a consideration of recoverability would facilitate the design of a highly recoverable, therefore less casualty-susceptible, organization.

This property of an organization to recover at least a portion of its combat power after degradation was examined according to the following general scheme:

1 - Determine the absolute minimum essential personnel and materiel that is demanded by a unit's mission. For example,

a squad envelopment requires, at the very least, two personnel teams: one for the base of fire, and one to maneuver.

2 - Determine the suitability and transferability of other organizational personnel/equipment into the essential teams required for mission performance. This required an examination of every single billet and item of equipment in the battalion to establish their suitability as replacements for every other billet or piece of equipment.

3 - At random, attrite the personnel and equipment of the organization (a repetitive process to develop statistically useful data).

4 - Analyze the ability of the unit to recover as much combat power as possible through reorganization and/or redistribution. For example, if a squad leader starts with three four-man fireteams, he can quickly reconstitute some portion of his squad's ability to advance by fire and maneuver by creating two three-man fireteams in a minimal amount of time. This reconstitutability is considered an organizational property and is a vital signal of force structure adequacy or inadequacy.

5 - Through repetitive analyses, consider varied combinations of personnel/equipment casualties to gain insights into unit reconstitutability with many different personnel/equipment loss mixes.

6 - Apply the personnel and equipment strengths and weaknesses determined by the technique outlined above, to assist in the design of a new battalion structure.

Specific Methodology

In order to accomplish the above tasks within a reasonable amount of time, computer and analytic assistance was required. A contract was negotiated with Science Applications, Inc. to gain the use of their computer model, Analysis of Military Organizational Effectiveness (AMORE). The AMORE methodology presents a structured approach to the building and integrating of functional teams within an organization. AMORE also considers the reconstitutibility of organizations that have been degraded by personnel and/or equipment losses. The model was run about 400 times in the course of this analysis.

A significant aspect of the model's consideration of unit recoverability after combat degradation is the time required for the unit commander to determine the extent of personnel casualties and materiel damage and, in turn, to reallocate his remaining resources to regain as much efficiency as possible. This time is termed "commander's decision time" and is considered to be an increasing function of the number of casualties sustained. As casualties increase to a certain level, the decision time is expected to peak and start to decrease. This occurs since the commander would eventually be confronted with

fewer and fewer possibilities from which to choose or, ultimately, his unit would be attrited to such an extent that his senior commander would most likely intervene.

The curve in figure III-1 represents this decision process and was used extensively in the study to reflect commander's decision time whenever it was required.

Besides commander's decision time, some other specifics were necessary before computer simulation could begin. In

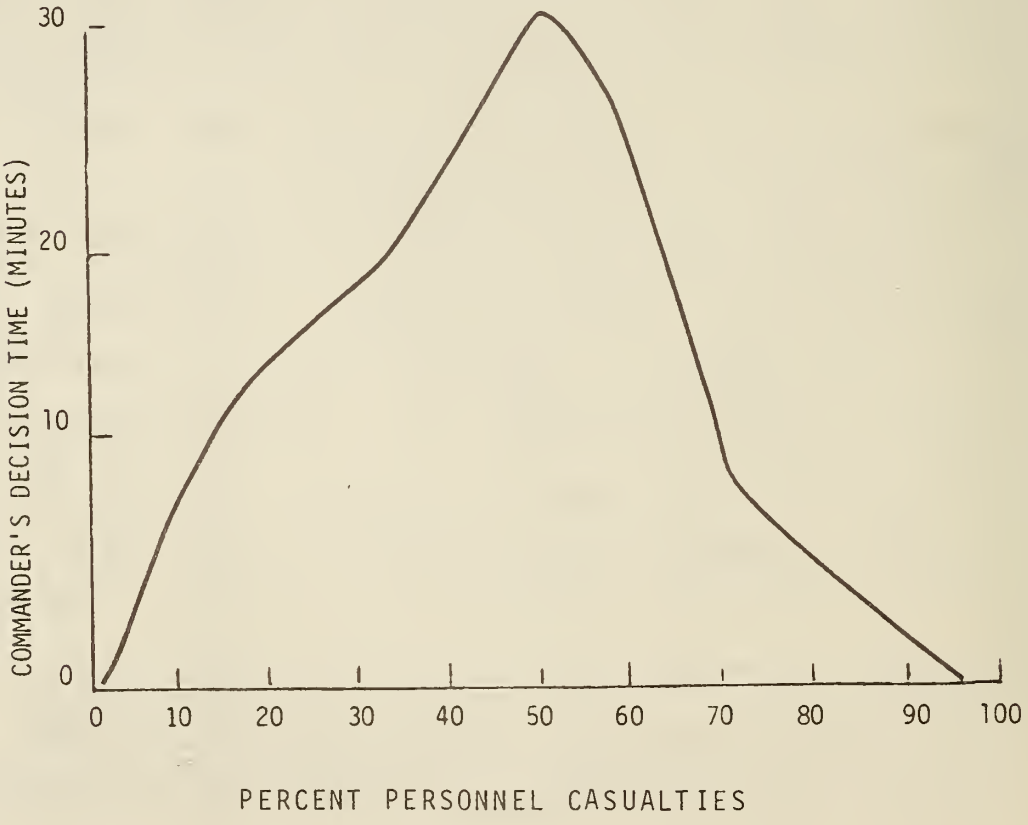

Figure III-1 - Model of Commander's Decision Time as a Function of Personnel Casualties

order to make the analysis as useful as possible, it was determined in advance that the battalion being analyzed would be considered to be at 100% personnel and equipment strengths prior to combat degradation. Although this situation is far from the norm for combat units, it was adopted for purposes of study so that the study results could be compared against a clearly established objective. If the battalion to be analyzed were already in a degraded status, it would be difficult to evaluate the impact of combat degradation on certain equipment and personnel skills that might be short or critical only because of an already existing shortage. In the case of equipment, vulnerability was treated on an item by item basis. Radio equipment included basic radio, antenna, power source, and remote device if applicable. The infantry battalion was restricted to organizational level maintenance on all organic equipment. Some other assumptions were used as a base for analysis and to facilitate computer simulation of infantry battalion effectiveness:

- A three-man fireteam was considered the smallest element possible in an infantry battalion. This meant that the computer model would attempt to reconstitute fireteam(s) at such time as fireteam level(s) dipped to two or less.
- Each rifle squad required at least two fireteams for tactical employment.
- Tactical employment of the rifle platoon required three rifle squads.
- The rifle company required three rifle platoons for tactical employment.

- The infantry battalion required at least three rifle companies for tactical employment. These companies provide fire, maneuver, and reserve elements.

In the construction of weapons platoon, weapons company, and H&S Company essential teams, it was necessary to extrapolate beyond the guidelines summarized above, by modeling the essential teams for these units as support elements of basic maneuver units. For all units examined, determination of the unit's resiliency was based on its capability to reconstitute to the minimum required level. In other words, a rifle platoon that, when degraded, was able to reconstitute to three rifle squads was considered more resilient than a rifle platoon which, with similar combat degradation, was able to reconstitute to only two rifle squads.

Ideally, every potential battalion organizational structure which the study team considered, could have been modeled by the AMORE process. However, the cost and the time to accomplish this would produce very little that could not be determined from repeated analyses of a single baseline structure. For this reason, a base structure was selected and insights into the organizational strengths and weaknesses of this structure were applied to other candidate structures. The selected structure was the current interim infantry battalion organization ("I" Series). This structure was selected because it has never been subjected to a detailed evaluation and also because it contains all of the elements of infantry battalion

structure needed for the design of any infantry battalion; namely, maneuver elements, firepower elements, command and control elements, and support. The remaining portions of this section discuss the results of the AMORE computer simulation of the infantry battalion modules described earlier.

Rifle Platoon Attack (Sustained)[1]

The precise input data prepared for analysis of the platoon (sustained attack) consisted of personnel and materiel transferability matrices, equipment repairability and vulnerability data, essential personnel skills required for continued operations, and essential materiel. The determination of minimum essential teams will be discussed briefly in this section.

Based on earlier assumptions that a fireteam requires at least three members, a squad requires at least two fireteams, and a platoon needs three squads to be capable of effective tactical employment, it was determined that an infantry platoon must have a total of six essential teams of personnel to be able to accomplish its combat mission. The six essential teams consist of three rifle squad teams, each composed of a minimum of two three-man fireteams. This organizational concept ensures that each squad has at least one element for both fire and maneuver. Likewise, the platoon has a fire, a maneuver, and a reinforcing/reserve element.

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[1]Discussion of the analysis of the rifle platoon in sustained offensive operations is presented in greater detail than are subsequent discussions. This was done only to provide insight into the methodology and its rigor.

The six essential teams are organized as shown in figure III-2 (note how command and control elements became essential

			ESSENTIAL PERSONNEL TEAMS						
TASK NAME	T/O	NO.	1	2	3	4	5	6	IR
PLT CMDR	1	1			1				
PLT SGT	1	2		1					
PLT GUIDE	1	3							1
MSGR R/O	1	4		1					
1st SQD LDR	1	5	1						
FT LDR	3	6	1			2			
AUTO RM	3	7	2			1			
GRND RM	3	8	2			1			
RIFLEMAN	3	9				1			2
2nd SQD LDR	1	10		1					
FT LDR	3	11		1			2		
AUTO RM	3	12		2			1		
GRND RM	3	13		2			1		
RIFLEMAN	3	14					1		2
3rd SQD LDR	1	15			1				
FT LDR	3	16			1			2	
AUTO RM	3	17			2			1	
GRND RM	3	18			2			1	
RIFLEMAN	3	19						1	2
TOTALS	43		6	8	7	5	5	5	7

Figure III-2 - Personnel Essential Teams for the Rifle Platoon

as teams increased). The column labeled as "IR" contains the remaining personnel from a full rifle platoon table of organization ("I" Series); these persons constitute an internal reserve of persons available for transfer into positions on the essential teams as necessary, and possible.

In summary, the combat capability of the platoon was considered by the model to require three squads. Starting with a full platoon, casualties to platoon members and equipment were simulated on a random basis; this process was repeated about fifty times. Each artificially degraded platoon was then reorganized by the model according to the rules established by the various input data, e.g., the personnel transferability matrix allowed substitution of the platoon sergeant for a lost platoon commander after a ninety minute time penalty for briefings, familiarization, and coordination. Success in reorganizing was judged by whether or not three squads of two fireteams each, plus necessary command and control, could be reconstituted. If they could, the structure was considered strongly resilient for combat; any reconstituted platoon with less than six essential teams but more than the three considered barely sufficient to permit the platoon to operate in a marginally effective manner was considered less resilient; a platoon with less than three essential teams was considered ineffective.

In similar fashion, once the determination of essential personnel was completed, consideration of essential materiel began. Figure III-3 displays the essential materiel requirements for each team of the rifle platoon. The column headed "T/E" shows the number of essential items from the table of equipment which are on hand at the beginning of operations. Each item of equipment corresponds to an essential personnel

skill contained in the same team number of the personnel essential teams, i.e., as shown in figure III-2. For example, in the column corresponding to team #1, four M16A1 rifles and two M203 grenade launchers are indicated. These weapons correspond to the individual weapon requirements associated with the personnel in essential team #1. Team #2 requires the same weapons plus one AN/PRC-77 radio for the messenger-radio operator. Remaining materiel essential teams were constructed in like manner.[2]

			ESSENTIAL MATERIEL TEAMS						
MATERIEL	T/E	NO.	1	2	3	4	5	6	IR
PLT HQ M16 PRC 77	2 1	1 2		 1					2
1st SQD M16 M203	10 3	3 4	4 2			4 1			2
2nd SQD M16 M203	10 3	5 6		4 2			4 1		2
3rd SQD M16 M203	10 3	7 8			4 2			4 1	2

Figure III-3 - Materiel Requirements for Each Essential Team

Using all input data, the AMORE model was executed several times for each of four personnel casualty levels (10%, 20%, 30%, and 40%), each of four materiel damage levels (expected damage

[2]The term "personnel intensive" is often applied to infantry structure. The exercise of constructing materiel essential teams for use in the AMORE model caused the study team to conclude that the term "personnel intensive" is accurate. The personnel organizational structure clearly dominates the model input data. It is suspected that the opposite would be true for units such as an aircraft squadron or tank battalion.

consistent with the damage levels provided as input, and double, triple, and quadruple the expected level), and for a combination of personnel/materiel assets. Separate curves of effectiveness as a function of time were produced and the analysis of these curves allowed observations to be made in regard to unit effectiveness. Not all curves are reproduced here, but figure III-4 is representative, as well as demonstrating a critical relationship. Note that at the 10% personnel casualty level, the platoon can reach a minimum level (three teams) in 30 minutes and can still reconstitute its six essential teams about five hours after experiencing casualties. If expected materiel damage occurs, however, reconstitution of only five teams is possible although a minimum capability is attained in slightly more than a half hour. An extra curve was then developed to show reconstitutability of materiel essential teams should only half the level of expected damage occur. At that relaxed damage level, the recoverability to six materiel teams was possible after about two hours with minimum capability being recovered in less than twenty minutes.

The inference to be drawn from the above comparison is that at the 10% personnel casualty level, personnel are adequate to regain nearly full combat power by reconstituting all six essential teams of personnel but expected materiel damage prevents such recoverability. If expected materiel damage could be cut

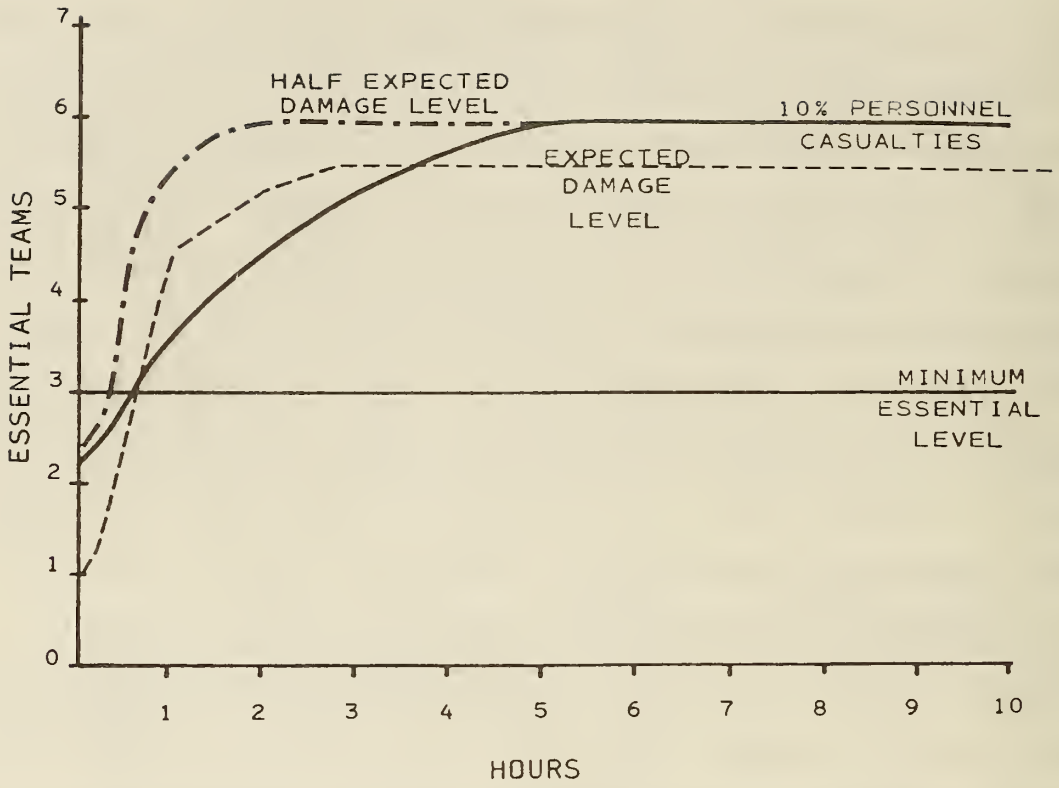


Figure III-4 - The Reconstitution of Essential Teams As a Function of Time

in half, however, a full six teams can be rebuilt. Unfortunately, reduction of expected damage levels to .5 of the anticipated levels is not a reasonable expectation so some other approach must be used. In this case, chokepoint analysis was used to identify the materiel items most responsible for failure to reconstruct the sixth team. By adjusting the table of equipment allowances or placement of these items in essential teams, some improvement in reconstitution capacity may be expected. This technique of producing recoverability curves and following up with chokepoint analysis was used for each personnel/materiel loss level and for each module being examined.

Through the several effectiveness analyses, it was observed that a Marine rifle platoon could remain a viable fighting entity in a sustained attack environment while receiving somewhat in excess of 30% personnel casualties. Furthermore, the nature of the curves suggested that a highly trained unit would recover at a faster rate than a unit with average proficiency, and that cross training of personnel for key billets would further enhance recoverability (not in recovery rate which might even slow down in some instances, but in terms of recovery level, i.e., number of essential teams).

From the standpoint of materiel effectiveness, it appeared that the platoon may absorb up to triple the expected damage and still satisfy minimum materiel requirements. In terms of essential team recovery, though, there was room for improvement in that all six teams were never able to be reconfigured.

Figure III-5 summarizes the effectiveness analyses in terms of essential team decomposition. A balance between personnel and materiel degradation would be optimal. As the graph shows, however, materiel teams fell below the acceptable level with 28% degradation of equipment, whereas personnel losses reached approximately 38% before the platoon became ineffective in terms of personnel. Chokepoint analysis was then performed to identify the critical materiel items and personnel billets.

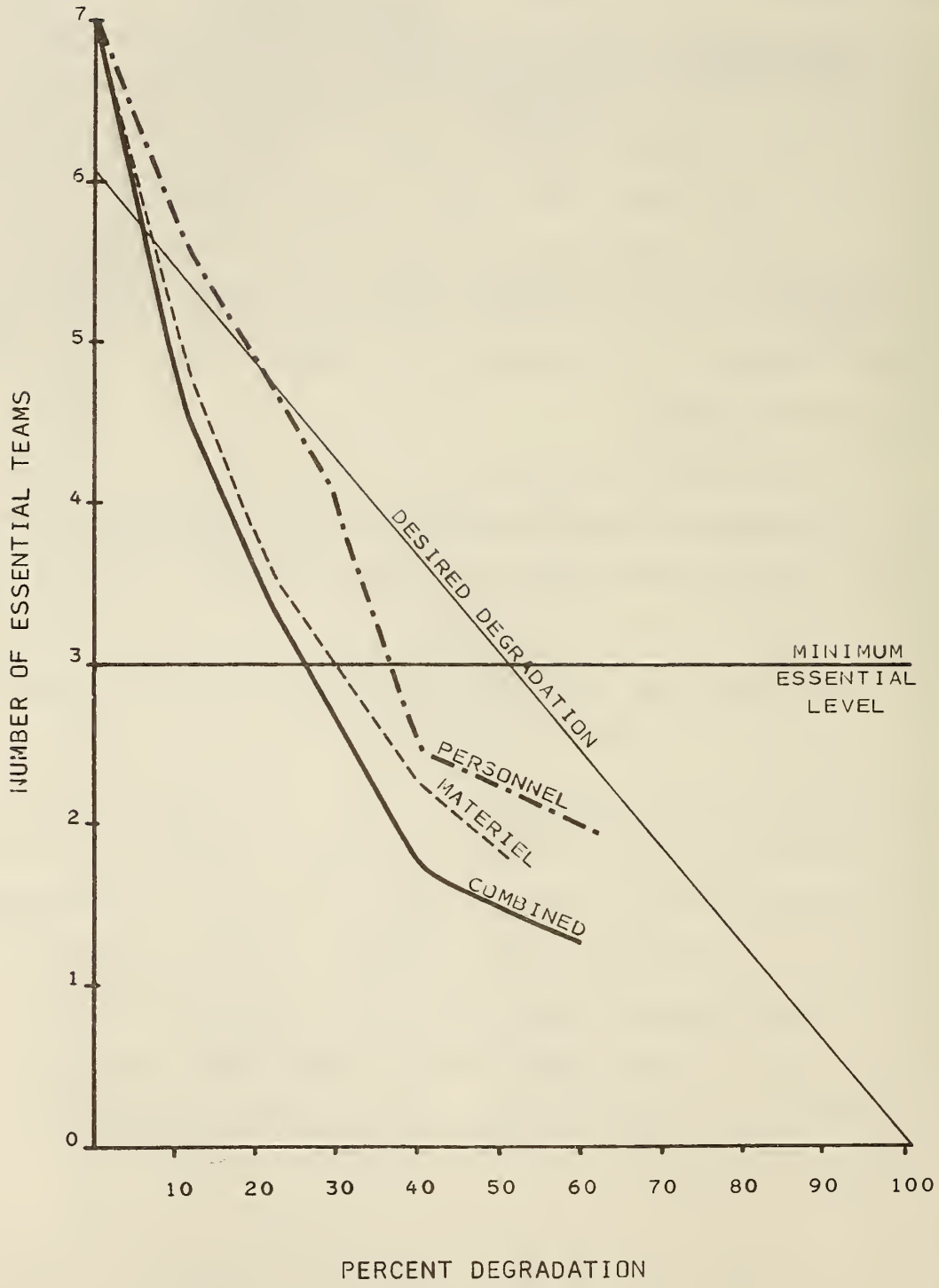


Figure III-5 - Degradation of Personnel and Materiel (Rifle Platoon-Sustained)

The most critical personnel chokepoints were in command/control billets. This again prompts recognition of the value of training subordinate personnel to fill key positions one or two levels higher than their own. Materiel chokepoints were seen to converge on the AN/PRC-77 Radio and the M203 grenade launcher as critical equipment items. Placing an additional radio in the platoon and altering the M203/M16 weapon mix from the baseline 9/32 to 12/29 appeared to reduce this criticality. Figures III-6 and III-7 summarize the results of chokepoint analyses.

Recognition of chokepoints alone was considered important, but there was still the possibility that correction of some or all chokepoints would not significantly improve platoon effectiveness. In order to estimate what contribution to the level of effectiveness each correction might make, factorial analysis was conducted. The results are briefly discussed below.

- The addition of another AN/PRC-77 to the platoon did not significantly improve unit capability at the ten percent personnel casualty level until five hours had passed. After that time the improvement was 20% of one team; this increased to 27% of a team after ten hours.
- Changing the M16-M203 weapons mix made an improvement of 37% of one team at the ten percent personnel casualty level after two and one-half hours; this increased to 64% of one team after ten hours.
- At the thirty percent personnel loss level, the above two factors react similarly. After ten hours the extra radio would add 35% of a team as also would the M16/M203 mix modification.

Pers Cas Level	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr. Tries	Specific Chokepoint(s)
10%	5	2	2	Platoon Sergeant
		6	5	Squad Leader Fire Team Leader
20%	4	2	2	Platoon Sergeant
		3	2	Platoon Commander
		5	5	Platoon Commander Automatic Rifleman Grenadier Rifleman Squad Leader Fire Team Leader
		6	30	Squad Leader Fire Team Leader Grenadier Rifleman
30%	3	2	7	Platoon Sergeant
		3	6	Platoon Commander
		4	3	Squad Leader Grenadier Rifleman
		5	20	All Billets
		6	10	
40%	2	2	5	Platoon Sergeant
		3	10	Platoon Commander
		4	10	All Billets
		5	15	
		6	2	

Figure III-6 - Personnel Chokepoints

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr. Tries	Specific Chokepoint(s)
Half Expected Level	5	2	2	PRC-77
		5	4	M203
		6	12	M203
Expected Level	4+	2	8	PRC-77
		6	15	M203
Double Expected Level	4	2	8	PRC-77
		4	2	M203
		5	6	M203
		6	20	M203 M16

Figure III-7 - Materiel Chokepoints

- Although the value of training was difficult to quantify, it was evaluated by relaxing the rules for transferability between billets. For example, since with increased training an automatic rifleman might be able to take over a squad leader's position with minimal loss of efficiency, the model was re-run with transferability rules loosened. There was virtually no impact with ten percent personnel casualties, but at the thirty percent level there was a gain of nearly a full team after ten hours. This suggests the need for depth in training unit leaders.

- While consideration of each of the above factors singly indicated that some improvement would result from adjusting the baseline structure, there were dramatically more significant interactions when the suggested improvements were applied in pairs. If both the weapon mix and radio addition were applied at the expected damage level, the availability of more than one full team could be expected at five hours (111% improvement). When the damage level was doubled, the improvement barely dropped (92%), i.e., the interactions of the two improvements tended to affect the decrease in effectiveness that accelerated damage would produce.

In summary, the following conclusions were made regarding the organizational capacity of the rifle platoon in sustained offensive operations:

- The platoon as presently configured can receive thirty percent personnel casualties and remain a viable fighting unit.

- The platoon as presently equipped can adequately respond to as much as triple the expected combat damage level.

- The platoon's most severe limitations are materiel oriented at personnel casualty levels up to twenty percent and personnel oriented at casualty levels greater than twenty percent.

- Effectiveness can be improved by ensuring upward mobility among unit leaders, i.e., training for depth.

- Effectiveness can be improved by exchanging one M16 rifle for one M203 grenade launcher within each rifle squad.

- Effectiveness can be improved by providing an additional platoon radio as a backup for the primary radio.

- Observations:
  - Secondary/tertiary skills and MOS's are likely to be much more important than in the past.
  - Reconstitution of unit effectiveness is a continuous activity that should be examined more closely in order to better understand its importance.

Rifle Platoon Attack (Surge)[3]

- *Minimum Essential Teams*

Personnel requirements for each team were the same for the surge mission as for the sustained except that the platoon commander's billet was not made a mandatory position until the fourth essential team was built. This reflects the realistic case in which a platoon would still be committed to combat even though the platoon sergeant was temporarily in command.

Materiel requirements were the same as for the sustained mission.

- *Effectiveness Analysis*

Review of the effectiveness curves indicated that the rifle platoon as presently configured is highly capable in the surge mission. It remains a viable fighting entity even with forty percent personnel losses and four times the expected amount of materiel damage. In a surge situation, reconstitution is faster than in sustained operations and to higher levels. This is primarily so because it takes less time for personnel to assume the basic proficiency levels required for the surge

[3]This and the remaining topics in this section follow the same pattern as the foregoing discussion but are in summarized form for easier review.

mission, e.g., any Marine who picks up a grenade launcher during a firefight temporarily becomes a grenadier whereas during normal operations the role of grenadier rifleman is selectively assigned. Reconstitution is to higher levels because transferability rules are relaxed during surge periods, e.g., the 1st squad leader might be replaced by any 1st squad fireteam leader during a surge, whereas he would probably be replaced by the next senior member of the platoon in a period of sustained activity.

In the case of materiel, reconstitution is also faster in a surge. Although the operational tempo might be greater, the duration of a surge activity is less than in sustained operations. Therefore, the probability of materiel casualties decreases and reconstitution occurs earlier.

When personnel casualties and equipment damage were analyzed simultaneously, a strong relationship was noted between materiel damage and overall unit effectiveness. While personnel levels generally followed a predictable path during degradation, materiel did not. The impact of this gap was that during surge activities, the platoon's materiel effectiveness was not as strong as its personnel effectiveness, and overall mission capability was strongly dependent on the equipment status. Figure III-8 illustrates this trend.

- *Chokepoint Analysis*

This stage of analysis indicated that potential problems for the surge mission were similar to those for the sustained

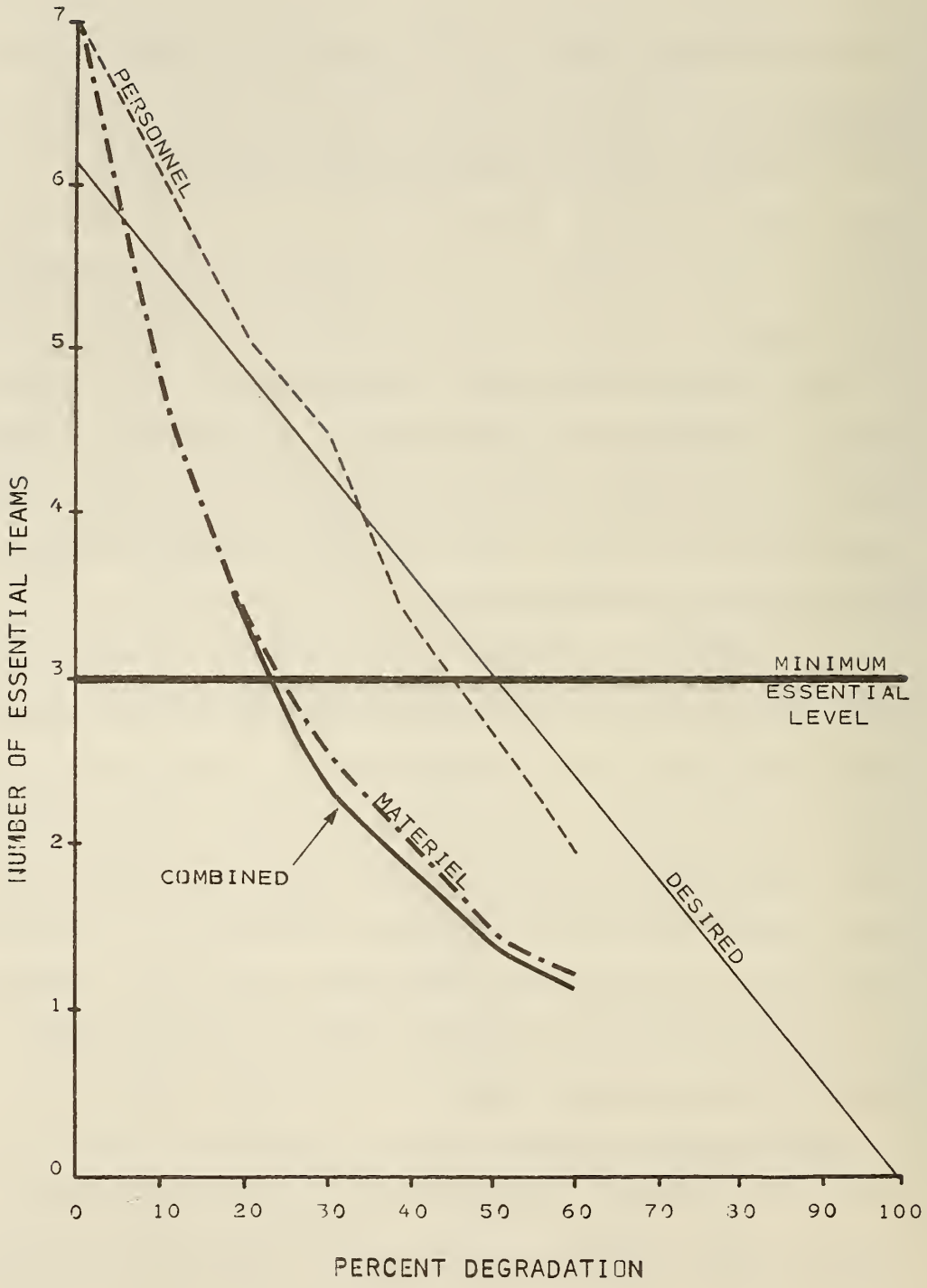


Figure III-8 - Degradation of Personnel and Materiel (Rifle Platoon-Surge)

mission, but to a lesser degree. The unavailability of sufficient numbers of trained persons to fill key billets, need for backup communications equipment, and the M16/M203 mix were prominent. Figures III-9 and III-10 summarize the results of chokepoint analyses.

Pers Cas Level	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr. Tries	Specific Chokepoint(s)
10%	5	6	3	Messenger/Radio Operator Fire Team Leader Squad Leader
20%	5	5	4	Fire Team Leader Grenadier Rifleman
		6	30	All Billets
30%	4	4	5	Platoon Commander Squad Leader Automatic Rifleman Grenadier Rifleman
		5	25	Most Billets
		6	18	All Billets
40%	4	2	2	Platoon Sergeant
		3	3	Platoon Sergeant Squad Leader
		4	20	Most Billets
		5	18	All Billets
		6	4	All Billets

Figure III-9 - Personnel Chokepoints

- *Factorial Analysis*

At the ten percent personnel casualty level, the addition of an AN/PRC-77 made a significant improvement in unit capability as early as 36 minutes after the attack. This occurred because the platoon with a surge mission reconstitutes to its maximum

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr. Tries	Specific Chokepoint(s)
Half Expected Level	6	2	2	PRC-77
		3	1	M203
		6	10	M203
Expected Level	5	2	2	PRC-77
		4	1	M203
		5	2	M203
		6	20	M203
Double Expected Level	3	2	3	PRC-77
		3	2	M203
		4	4	M203
		5	9	M203
		6	25	Most Items

Figure III-10 - Materiel Chokepoints

level much earlier than with a sustained mission. A modified weapon mix permitted improvement in unit capability after 1.8 hours and decreased materiel damage was only significant early in the reconstitution phase. As would be expected, there was an interaction of the M203 and M16 and low materiel damage was positive early in the reconstitution process but this effect did not remain. Accordingly, providing the platoon an additional AN/PRC-77 and altering the M203/M16 weapons mix would provide an increase in unit effectiveness of almost 60 percent of one team at low casualty levels.

When personnel casualties reach 30 percent, the impact of changes was less marked. Improving transferability was not significant in the surge mission because a liberal transfer

scheme was already in effect. The addition of one more M203 to each squad also had marginal effect on unit capability and only at low materiel damage factors (1.0 and 0.5) because sufficient M203s were always available to form essential squad teams when personnel casualties were high (30%). The addition of one AN/PRC-77 to the platoon's T/E was also insignificant.

- *Summary and Conclusions*

  - The rifle platoon as presently configured is highly resilient for surge operations. This is indicated by its capacity to retain combat potential even after receiving forty percent personnel casualties and four times the expected level of materiel damage.

  - The platoon can recover effectiveness faster and higher in surge than in sustained operations because a narrower range of capabilities are required for personnel transferability.

  - The addition of a backup radio provides marginal improvement in effectiveness at low personnel casualty levels.

  - Altering the M16/M203 ratio will increase effectiveness.

  - Overall unit effectiveness in surge operations is closely related to materiel effectiveness.

Weapons Platoon Attack (Sustained)

- *Minimum Essential Teams*

It was determined that nine essential personnel teams were necessary for the weapons platoon to furnish fire support to the rifle company. A minimum capability consisted of the first six teams. Figure III-11 shows the composition of the

			ESSENTIAL PERSONNEL TEAMS									
TASK NAME	T/O	NO.	1	2	3	4	5	6	7	8	9	IR
PLT CMDR	1	1							1			
PLT SGT	1	2	1									
PLT SGT R/O	1	3	1									
MG SCT LDR	1	4						1				
MG SQD LDR	1	5			1							
MG TM LDR	2	6		1	1							
MG GUNNER	2	7		1	1							
AMMO MAN	2	8		1	1							
AT SCT LDR	1	9						1				
AT TM LDR	1	10			1							
AMMO MAN	1	11			1							
MT SQD LDR	1	12	1									
ASST GUN	1	13	1									
AMMO MAN	1	14	1									
AT SCT LDR	1	15									1	
MG SQD LDR	1	16					1					
MG TM LDR	2	17					1	1				
MG GUNNER	2	18					1	1				
AMMO MAN	2	19					1	1				
AT SQD LDR	1	20										1
AT TM LDR	1	21						1				
AMMO MAN	1	22						1				
MT SQD LDR	1	23				1						
ASST GUN	1	24				1						
AMMO MAN	1	25				1						
MT SCT LDR	1	26				1						
MG SQD LDR	1	27									1	
MG TM LDR	2	28								1	1	
MG GUNNER	2	29								1	1	
AMMO MAN	2	30								1	1	
AT SQD LDR	1	31										1
AT TM LDR	1	32									1	
AMMO MAN	1	33									1	
MT SQD LDR	1	34							1			
ASST GUN	1	35							1			
AMMO MAN	1	36							1			
TOTAL	45		5	3	6	4	4	7	4	3	7	2

Figure III-11 - Personnel Essential Teams for the Weapons Platoon (Sustained)

personnel essential teams for the weapons platoon in sustained offensive operations.

Materiel essential teams are built around the individual and crew-served weapons needed by each of the personnel essential teams, with required communications support. Figure III-12 lists the essential materiel teams.

- *Effectiveness Analysis*

Effectiveness curves showed the weapons platoon to be very brittle organizationally. When personnel casualties exceeded even ten percent and materiel damage was at the expected level, the unit could not reconstitute the minimal number of essential teams.

It was found that materiel constrained effectiveness at the ten and twenty percent casualty levels while personnel shortages became dominant at thirty percent. When expected damage levels

			ESSENTIAL MATERIEL TEAMS									
MATERIAL	T/E	NO.	1	2	3	4	5	6	7	8	9	IR
M16	1	1										1
PRC 77	1	2	1									
M16	8	3	1	2	4			1				
M60	2	4		1	1							
M202	1	5			1							
60MM	1	6	1									
M16	9	7				1	3	3			1	1
M60	2	8					1	1				
M202	1	9						1				
60MM	1	10				1						
M16	9	11				1			1	2	4	1
M60	2	12								1	1	
M202	1	13									1	
60MM	1	14							1			

Figure III-12 - Materiel Essential Teams for the Weapons Platoon (Sustained)

were doubled, then the unit remained equipment-constrained until greater than forty percent personnel casualties had occurred.

Figure III-13 depicts unit degradation as a function of equal materiel and personnel losses; the gap between the personnel and materiel curves reflects potential for improving unit effectiveness.

- *Chokepoint Analysis*

Figure III-14 reflects chokepoints for personnel during the building of fifty weapons platoons. An analysis of effectiveness curves and assorted data revealed that unfilled leadership billets were a significant factor in not being able to reconstitute to higher levels of unit capability, especially at the lower casualty levels. The messsenger/radio operator was also determined to be a critical personnel skill. The availability of surplus personnel to fill leadership billets in the essential fire support teams indicated unit effectiveness could be improved if rules for assigning lower ranking personnel to key leadership billets in critical situations were relaxed. Consolidation of the platoon commander's and the platoon sergeant's functions at high casualty levels may also result in increased effectiveness; in reality, this consolidation occurs as needed during combat, so the criticality of these billets is already recognized in practice.

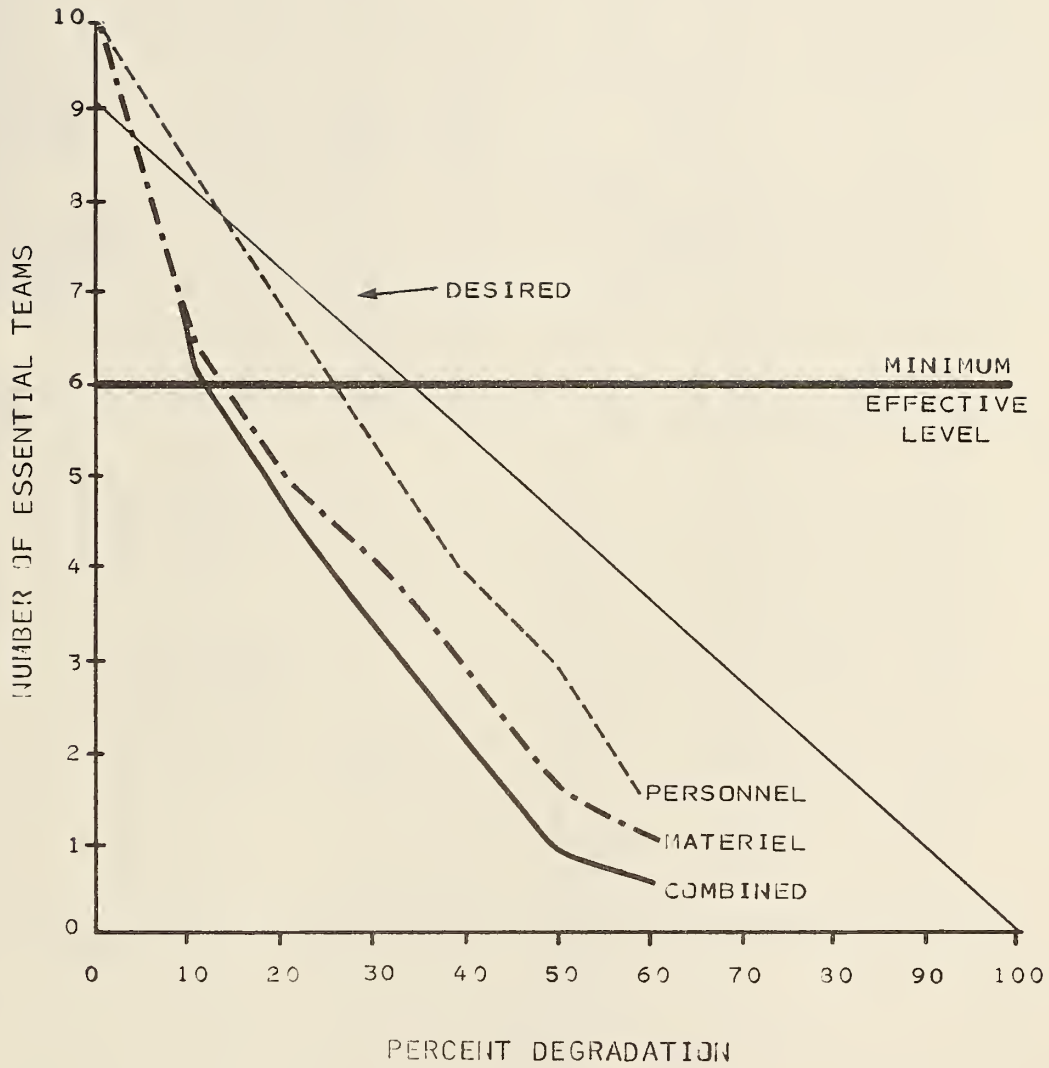


Figure III-13 - Degradation of Personnel and Materiel (Weapons Platoon-Sustained)

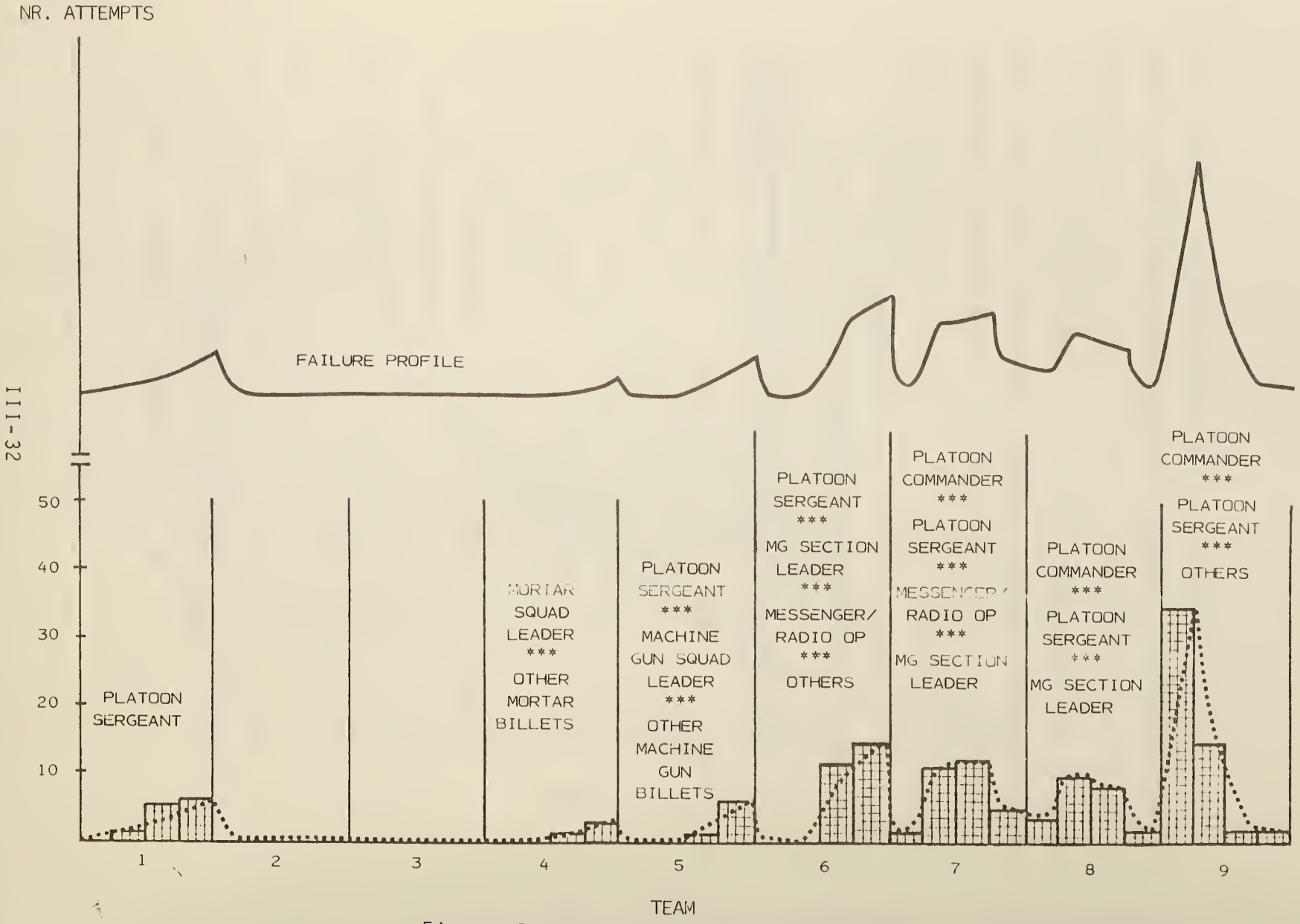


Figure III-14 - Personnel Chokepoints

Figure III-15 shows chokepoints for materiel. The AN/PRC-77 Radio, M202 Rocket Launcher, and 60mm Mortar were the primary constraints on unit effectiveness at every applied damage level. The removal of the M202 from the weapons platoon was not reflected in the AMORE data base to permit examination of the impact of this weapon. Based on fifty iterations, it was clear that the contribution of such a weapon justified its inclusion in the infantry battalion's arsenal.

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr. Tries	Specific Chokepoint(s)
Half Expected Damage	7	1	7	PRC-77
		6	3	M202
		7	2	Mortar
		8	2	M60
		9	15	M16, M60, M202
Expected Damage	7	1	3	PRC-77
		3	2	M202
		6	7	M202
		7	5	Mortar
		9	25	M16, M60, M202
		10	11	M16
Double Expected Damage	4	1	8	PRC-77
		3	8	M202
		6	20	M202
		8	3	M60
		9	12	M16, M60, M202

Figure III-15 - Materiel Chokepoints

• *Factorial Analysis*

The removal of the M202 suggested two bases for factorial analyses: a platoon with the M202 and one without it. The first analysis produced results suggesting that a strong positive factor was exerted by the presence of the M202 (or a weapon with similar characteristics). About 75% of the platoon's ability to improve degraded combat effectiveness resulted from the presence of a rocket launcher similar to the M202. This indicator tends to confirm the intuitive impression that there is a distinct need for the M202, or some alternative.

Analysis of a platoon without the M202 showed that the unit had relatively little capability to reconstitute lost combat efficiency. Increased radios provided an early increase in unit capability but this was negated over time, and personnel transfers tended (at certain casualty levels) to compound rather than reduce the degradation level.

Additional consideration of personnel transferability through relaxed personnel transfer rules did not contribute to improved unit capability until personnel casualties reached the thirty and forty percent levels. Accordingly, the platoon commander would probably minimize personnel skill transfers until casualty levels approached thirty percent. As this happened, a liberal transfer policy into key leadership billets to maintain the platoon structure and provide a full

complement of supporting weapons (rather than compacting the platoon around fewer weapons) would be the best approach. Implicit in this strategy is a requirement to train lower ranking platoon members to assume leadership at least two levels above their assigned tasks.

- *Summary and Conclusions*

  - The weapons platoon as presently configured appears only marginally capable of performing sustained offensive operations. This showed in the inability of the unit to reconstitute to the minimum level after receiving twenty percent personnel casualties.

  - The platoon can receive in excess of the expected level of materiel damage and still be able to reconstitute to a minimum level.

  - When both personnel and materiel losses occur together, the platoon cannot reconstitute to a minimum level after receiving only ten percent personnel casualties.

  - The weapons platoon should maintain maximal unit integrity at low personnel casualty levels (i.e., transfers to replace losses of key personnel should not be made early) but must train to reconstitute leadership billets as casualties increase (above twenty percent).

  - Increases in quantities of critical end items will not significantly improve unit effectiveness or ability to reconstitute.

Weapons Platoon Attack (Surge)

- *Minimum Essential Teams*

The personnel requirements for essential teams were similar to those for the platoon in sustained operations. But since the surge mission contains less requirement for

the weapons platoon to displace, the need for ammunition men was decreased. They were made part of the internal reserve and thus became immediately available for transfer to other billets.

Materiel requirements were also similar. An increased number of M16 rifles were moved to the internal reserve category as a result of the changes in personnel teams.

• *Effectiveness Analysis*

From the effectiveness curves, it was deducted that the weapons platoon was highly resilient in the surge attack mission. The weapons platoon with a surge mission could receive 40 percent personnel casualties at the expected damage level and still reconstitute to provide required fire support. In comparison, if the weapons platoon with a sustained mission received in excess of ten percent personnel casualties at the expected damage level, it was not always able to reconstitute to the minimal level. This difference between the two missions occurs because the weapons platoon (sustained) must be able to maneuver in order to provide support for rifle company maneuver elements. This mobility demands additional personnel, making the structure more brittle over a sustained period.

In similar fashion to sustained operations, materiel dominates the ability of the platoon to reorganize during the surge. Although the materiel status of the platoon did not prevent reconstitution even at double the expected damage

level, it did cause recovery to differ significantly from the rate permitted by increased personnel casualties up to the forty percent level. Figure III-16 shows the large gap that occurred between materiel and personnel curves. This reflects considerable potential for improving unit effectiveness.

- *Chokepoint Analysis*

Figure III-17 shows the chokepoints for personnel and figure III-18 contains the chokepoints for materiel. As has been previously observed, leadership billets were the most critical personnel chokepoints. Critical materiel were the AN/PRC-77 Radio, the M202 Rocket Launcher, and the 60mm Mortar.

- *Factorial Analysis*

Unit effectiveness was relatively unchanged by improvement of the personnel chokepoints. The only factors which provided any significant increase in organizational effectiveness were materiel; specifically, the incorporation of an extra radio and one more 60mm mortar caused an improvement of eighty percent of one team by easing the constraints imposed by materiel losses at expected levels.

- *Summary and Conclusions*

  - The weapons platoon is much more flexible and fluid in surge than in sustained operations.

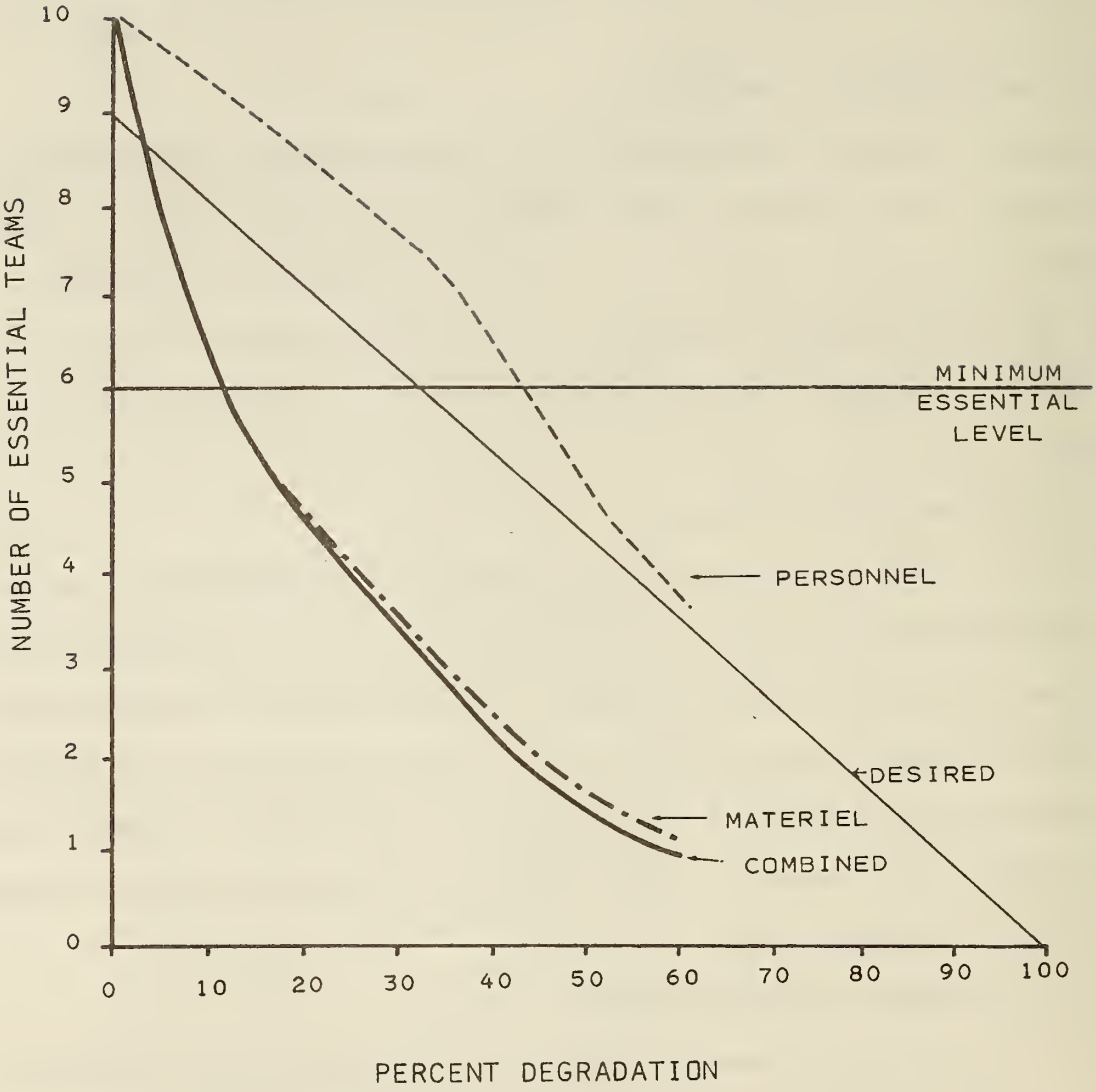


Figure III-16 - Degradation of Personnel and Materiel (Weapons Platoon - Surge)

Pers Cas Level	Avg Nr Teams	CHOKEPOINT SUMMARY	
		Leadership Billets	Other Billets
10%	9	MG Section Leader	
20%	8	Platoon Commander (2) 3 Section Leaders 3 Squad Leaders 1 Team Leader	Machine Gunner
30%	7	Platoon Commander (2) Platoon Sergeant (3) 4 Section Leaders 4 Squad Leaders 3 Team Leaders	Machine Gunner Asst Gunner (4)
40%	6	Platoon Commander (3) Platoon Sergeant (5) 8 Section Leaders 8 Squad Leaders 5 Team Leaders	Machine Gunners (3) Asst Gunner (3)

Figure III-17 - Abbreviated Personnel Chokepoint Summary

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr. Tries	Specific Chokepoints
Half Expected Damage	8	1	2	PRC-77
		6	2	M202
		8	2	M60
		9	20	M60, M202
Expected Damage	7	1	3	PRC-77
		6	7	M202
		7	2	Mortar
		8	2	M60
		9	23	M60, M202
Half Expected Damage	5	1	4	PRC-77
		3	4	M202
		6	12	M202
		7	2	Mortar
		8	1	M60
		9	15	M60, M202

Figure III-18 - Materiel Chokepoints

- The ability of the platoon to reconstitute lost combat efficiency is dominated by materiel availability.

- Addition of greater personnel numbers or depth does not significantly improve resiliency; adding selected items of equipment does.

Rifle Company Attack (Sustained)

• *Minimum Essential Teams*

Essential teams for the rifle company are built around the rifle platoons as maneuver elements, supported by fire from the weapons platoon. The first two personnel teams are, in fact, the essential personnel levels from the rifle platoons extended by adding a share of weapons support. The third team represents the potential for weighting the attack or forming a reserve. Teams four, five, and six supplement the first three (essential) platoon teams. Figure III-19 details the composition of teams.

The materiel essential teams are organized in the same manner as the personnel essential teams. Figure III-20 shows the distribution of essential equipment throughout the rifle company teams.

• *Effectiveness Analysis*

This phase of analysis showed that the rifle company could reconstitute to three teams within three to six hours after receiving up to thirty percent personnel casualties. As casualties approached forty percent, reconstitution became

			ESSENTIAL PERSONNEL TEAMS						
TASK NAME	T/O	NO	1	2	3	4	5	6	IR
CO CMDR	1	1		1					
CO EXECO	1	2							1
FIRST SGT	1	3							1
CO GUNNY	1	4			1				
SPLY SGT	1	5				1			
MSGR R/O	1	6		1					
W PLT CMDR	1	7			1				
PLT SGT	1	8	1						
MSGR R/O	1	9	1						
60 SCT LDR	1	10		1					
60 SQD LDR	3	11	1	1		1			
A GUNNER	3	12	1	1		1			
AMMO MAN	3	13	1	1		1			
MG SQD LDR	1	14					1		
TM LDR	2	15					2		
GUNNER	2	16					2		
AMMO MAN	2	17					2		
AT SQD LDR	1	18							1
TM LDR	1	19						1	
AMMO MAN	1	20						1	
1 PLT CMDR	1	21	1						
PLT SGT	1	22	1						
PLT GUIDE	1	23							1
MSGR R/U	1	24	1						
SQD LDR	3	25	3						
FTL	9	26	3			6			
AR MAN	9	27	6			3			
GR MAN	9	28	6			3			
RIFLEMAN	9	29				3			6
MG SCT LDR	1	30		1					
MG SQD LDR	1	31	1						
TM LDR	2	32	2						
GUNNER	2	33	2						
AMMO MAN	2	34	2						
AT SQD LDR	1	35							1
TM LDR	1	36	1						
AMMO MAN	1	37	1						
2 PLT CMDR	1	38		1					
PLT SGT	1	39	1						
PLT GUIDE	1	40							1
MSGR R/O	1	41		1					
SQD LDR	3	42		3					
FTL	9	43		3			6		
AR MAN	9	44		6			3		
GR MAN	9	45		6			3		
RIFLEMAN	9	46					3		6
MG SQD LDR	1	47		1					
TM LDR	2	48		2					
GUNNER	2	49		2					
AMMO MAN	2	50		2					
AT SCT LDR	1	51			1				
AT SQD LDR	1	52		1					
TM LDR	1	53		1					
AMMO MAN	1	54		1					
3 PLT CMDR	1	55			1				
PLT SGT	1	56			1				
PLT GUIDE	1	57							1
MSGR R/O	1	58			1				
SQD LDR	3	59			3				
FTL	9	60			3			6	
AR MAN	9	61			6			3	
GR MAN	9	62			6			3	
RIFLEMAN	9	63						3	6
TOTALS	180		36	37	24	19	22	17	25

Figure III-19 - Personnel Essential Teams (Rifle Company-Sustained)

				ESSENTIAL MATERIEL TEAM						
	MATERIEL	T/E	NO	1	2	3	4	5	6	IR
CO HQ	M16	2	1				1			1
	PRC 77	1	2		1					
WPN PLT HQ	M16	1	3							1
	PRC 77	1	4	1						
	M16	4	5	1	1		1			1
	60MM	3	6	1	1		1			
	M16	5	7					4		1
	M60	2	8					2		
	M16	2	9						1	1
	M202	1	10						1	
1st PLT	M16	2	11							2
	PRC 77	1	12	1						
	M16	30	13	12			12			6
	M203	9	14	6			3			
	M16	5	15	4						1
	M60	2	16	2						
	M16	2	17	1						1
	M202	1	18	1						
2nd PLT	M16	2	19							2
	PRC 77	1	20		1					
	M16	30	21		12			12		6
	M203	9	22		6			3		
	M16	5	23		4					1
	M60	2	24		2					
	M16	2	25		2					
	M202	1	26		1					
3rd PLT	M16	2	27							2
	PRC 77	1	28			1				
	M16	30	29			12			12	6
	M203	9	30			6			3	

Figure III-20 - Materiel Essential Teams
(Rifle Company-Sustained)

impossible. An impression that the initial shock accompanying this number of casualties would be severe and that such a shock would last for some extended time, can be formed from military experience. In terms of the computer model, this factor exhibited itself in the form of very slow recovery time, suggesting that at high casualty levels the company structure was less flexible than desired and should be modified to enhance the rate of recovery.

The company was not very efficient in terms of materiel. With expected damage the organization barely recovered to the minimum level of three essential teams; in fact, at only half the expected level of damage recovery was only to the fourth essential team.

Although the personnel recovery, when considered alone, was adequate (although slow), the consideration of personnel in conjunction with equipment losses cancelled that situation. The number of essential materiel teams dominated the reconstitution of company capability at every level of personnel casualties. Figure III-21 illustrates this relationship. It is apparent that materiel teams fell beneath the minimum level at approximately ten percent damage while personnel teams did not drop below the minimum until the company received about 32 percent personnel losses.

The width of the gap between the personnel and materiel curves in figure III-21 indicate significant potential for improved recoverability.

- *Chokepoint Analysis*

Once again, the need for training of Marines to assume leadership billets two levels above their own position was identified. There was some inability to reconstitute as freely as possible due to personnel interactions, but the main restrictions were materiel. The M202, or some similar weapon appeared frequently as a critical item, suggesting that the

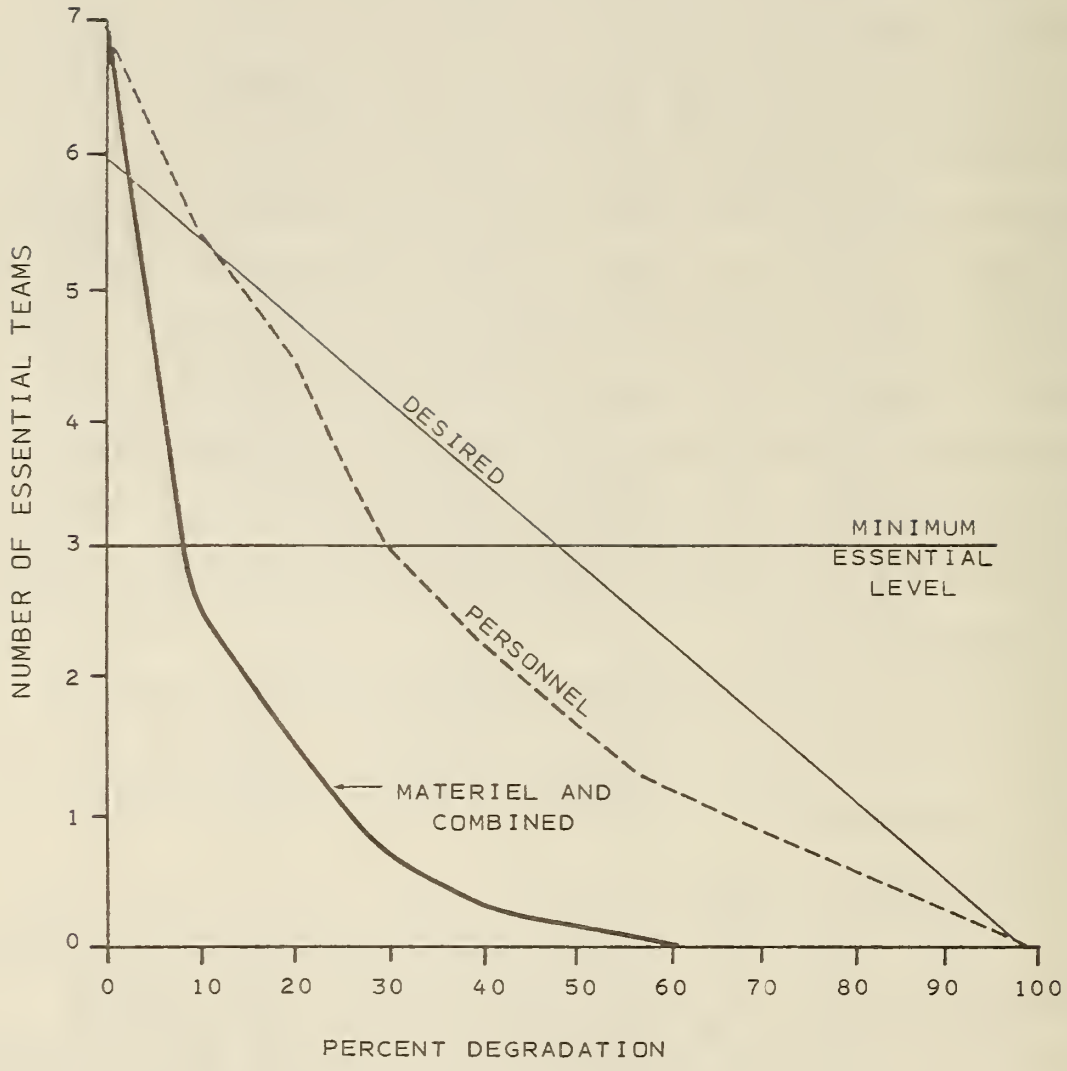


FIGURE III-21 - DEGRADATION OF PERSONNEL AND MATERIEL
(RIFLE COMPANY-SUSTAINED)

rifle company might be less flexible than desired, in the absence of such a weapon.

Chokepoints for personnel and materiel are summarized in figures III-22 and III-23. The frequency with which the M202 emerged as a chokepoint is considered worthy of note. In

Pers Cas Level	Avg Nr Teams	CHOKEPOINT SUMMARY	
		Leadership Billets	Other Billets
10%	5	AT Section Leader Team Leader	
20%	4+	Company Commander 1 Platoon Commander Gunnery Sergeant 2 Platoon Sergeants 3 Section Leaders 3 Squad Leaders 2 Team Leaders	Messenger/Radio Op Gunner Asst Gunner Ammo Man
30%	3	Company Commander 2 Platoon Commanders Gunnery Sergeant 1 Platoon Sergeant 3 Section Leaders 2 Squad Leaders 1 Team Leader	Messenger/Radio Op Gunner Asst Gunner Ammo Man Gren Rifleman
40%	3	Company Commander 4 Platoon Commanders Gunnery Sergeant (2) 4 Platoon Sergeants 4 Section Leaders 4 Squad Leaders 3 Team Leaders	Messenger/Radio Op (2) Gunner Asst Gunner Ammo Man

Figure III-22 - Abbreviated Personnel Chokepoint Summary

addition, certain potential personnel chokepoints appeared in areas where interactions with other billets were infrequent, e.g., the supply sergeant. Although this position could be left unfilled in a surge situation, its importance is greater in sustained operations. The supply sergeant is not shown in figure III-22, but that position prevented reconstitution of

Material Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr Tries	Specific Chokepoints
Half Expected Damage	5	1	2	M202
		2	4	PRC-77, M202
		3	8	PRC-77
		4	10	Mortar, M203
		6	7	M202, M203
Expected Damage	3	1	2	M202
		2	10	PRC-77, M202, Mortar
		3	14	PRC-77
		4	10	Mortar, M203
		5	5	M60, M203
		6	4	M202
Double Expected Damage	2	1	7	M202
		2	25	PRC-77, M202, M60
		3	7	PRC-77
		4	5	M203
		5	2	M203
		6	4	M202

Figure III-23 - Materiel Chokepoints

capability on occasion and, especially if other members of the headquarters element are unavailable, might require transfer from one of the platoons (for sustained operations only).

- *Factorial Analysis*

Correction of deficient trends produced improved efficiency of the company over time, but not immediately. To isolate the specific factors which were most active in causing the improvement, factorial analysis was conducted on the combined (materiel and personnel) teams effectiveness curves at the expected damage level and twenty percent personnel casualties.

The addition of AN/PRC-77's did not make a significant improvement until eight hours after the application of damage. At that time, the improvement was 69 percent of one team; this increased to 88 percent of one team after ten hours. The additional 60mm mortar did not contribute to the increase in unit capability (this same result was noted in the weapons platoon analysis). Changing the M16/M203 weapon mix contributed significantly to the recovery of unit capability after 8 hours, with improvement ranging from 63 to 77 percent of one team. Increased leadership training (or related transfers) initially had a negative effect, a little over half a team, until after eight hours. At that time, increased leadership training started making some positive contributions to unit capability (approximately one-half a team). This suggests that reorganization to recover from personnel casualties should not be instituted immediately on occurrence of the casualty. The use of an acting, or temporary, leader for a brief period of time appeared to be a more organizationally sound, and less turbulent, approach.

The application of suggested improvements in pairs, rather than individually, produced no significant interactions.

- *Summary and Conclusions*

  - The rifle company, as traditionally organized, is very healthy in terms of recovery from personnel losses, but limited from rapid reconstitution by its materiel dependence.

- The combination of expected levels of materiel damage and only slight personnel losses can prevent the rifle company from regaining the degree of combat power that available personnel could make possible.

- The reconstitution of the company appears to be mainly bound by the AN/PRC-77 radio and the M203 grenade launcher.

- Unit capability can be increased by the addition of (a) backup radio(s), and exchanging one M16 for one M203 within each rifle squad.

- The company's recoverability would not improve in the short term, even if the above actions were initiated. This prompts a conclusion that the company must consciously train for and test its ability to recover from combat loss, especially equipment damage. Furthermore, additional investigation of the rifle company's reaction to (personnel and equipment) casualties appears warranted; inclusion of this item as a requirement for further study within the Marine Corps Five Year Study Program is suggested.

Reinforced Rifle Company Attack (Sustained)

- *Minimum Essential Teams*

This analysis examined a rifle company identical in organization to that in the previous section, but augmented in certain areas. A DRAGON team was included with each of the forward rifle platoons and one was held in reserve for the

company commander. The second essential (platoon) team was augmented with an 81mm mortar forward observer and a radio operator from a tactical air control party; other attached members were assigned to various teams to supplement the minimum teams. The materiel teams were organized in the same manner but certain equipment alterations were made: the digital communications terminal (DCT) was added to the existing forward air control radios and modular universal laser equipment (MULE) was also added to assist in the air support function. The modifications were made to permit examination of the impact of combat damage to these items when they become fully operational.

- *Effectiveness Analysis*

When the results of effectiveness curves for the reinforced company were compared with those for the rifle company, no new or additional trends were identified. Reconstitution was dominated by the number of available materiel teams and, as with the rifle company, the unit was often prevented from recovering degraded capabilities even though the needed personnel assets were available. Figure III-21 on page III-44 essentially represents the degradation of materiel and personnel teams for the reinforced, as well as the basic, rifle company structure.

- *Chokepoint Analysis*

As was the case with effectiveness analysis, the chokepoint analysis produced results similar to those derived from

examination of the basic company. To the factors shown in figure III-22, however, should be added two observations unique to the reinforced company.

First, it was observed that DRAGON gunners became chokepoints due to the absence of transferable, i.e., trained, replacements from within the rifle company. As DRAGON teams were decentralized through attachment to the rifle company, the crew members were no longer supportable by their parent (weapons) company. Since the members of the rifle company were all assigned primary responsibilities other than as DRAGON crew members, they were not appropriate replacements for DRAGON gunners who became casualties. As a result, the recoverability of unit effectiveness was somewhat constrained in cases where DRAGON gunners became casualties. The cross training of riflemen as gunners would ease this limitation (which arises only in cases where DRAGONs are attached).

Another difficulty in reconstitution arose with forward and air observers. The absence of these skills in the internal reserve required the transfer of less than fully qualified persons into the vacancies created as observers became casualties. In-depth training of all infantry officers, and perhaps staff noncommissioned officers, to perform observation tasks would greatly facilitate the recovery of this vital function when primary incumbents become ineffective.

Figure III-24 summarizes the equipment chokepoints.

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr Tries	Specific Chokepoint(s)
Half Expected Level	3	2	8	M202, PRC-47
		4	10	M203
		5	5	M60, M202, M203
		6	18	M202, M203
Expected Level	2	2	20	M202, PRC-47
		3	3	PRC-77
		4	10	Mortar, M203
		5	12	M60, M203, DCT
		6	5	M202, M203, DRAGON
Double Expected Damage	1	1	10	M202
		2	30	PRC-77, PRC-47, M202, M60
		3	2	PRC-77
		4	4	Mortar, M203
		5	5	M60, M203, DCT

Figure III-24 - Materiel Chokepoints

- *Factorial Analysis*

Substituting the digital communications terminal for other radio equipment did not produce any increase in efficiency, but the frequency with which various communications items surfaced as chokepoints suggested that an increase in the total number of radios (by adding squad radios, for instance) available to the company would be beneficial.

An increased degree of familiarity of riflemen with DRAGON gunnery was simulated by relaxing the transferability rules used by the model. This provided an additional one-quarter team at four hours after attack. The adoption of other (materiel) improvements caused a 27% of one team increase in

efficiency after two hours with a jump to a full team after four hours, and more than a team and a half after ten hours.

- *Summary and Conclusions*

- The reinforced rifle company and the basic rifle company both display the same organizational characteristics.

- Improvements to the rifle company, already mentioned, would also benefit the reinforced rifle company.

- Reinforcements to the rifle company would possess a higher degree of recoverability if the members of the reinforced company were able to transfer to vacant positions within the reinforcing element(s); this strongly applies to DRAGON crews.

Weapons Company Attack (Sustained)

- *Minimum Essential Teams*

The personnel skills of the weapons company are somewhat more specialized than in a rifle company. A natural consequence of this fact is a reduced amount of personnel transferability. Essential teams were built around a capability to provide both anti-armor and indirect fire support to the rifle companies. Thus, each essential team contains a mix of military occupational skills to ensure the presence of both capabilities in at least the first two teams. Figure III-25 presents the teams in detail.

			ESSENTIAL PERSONNEL TEAMS						
TASK NAME	T/O	NO	1	2	3	4	5	6	IR
CO CMDR	1	1		1					
EXECO	1	2							1
FIRST SGT	1	3							1
OPS CHIEF	1	4		1					
OPS SGT	1	5			1				
SUPPLY SGT	1	6				1			
MSGR/DRVR	2	7		1					1
PLT CMDR-81	1	8				1			
A PLT CMDR	1	9							1
PLT SGT	1	10	1						
AMMO NCO	1	11				1			
AMMO TECH	1	12		1					
MSGR DRVR	1	13	1						
SECT LDR	4	14		1			1		2
AMMO NCO	4	15	1			1	1		1
AMMO/DRVR	8	16	1	1		1	1		4
FWD OBSVR	4	17	1	1		1	1		
SQD LDR	8	18	2	2		2	2		
GUNNER	8	19	2	2		2	2		
A GUNNER	8	20	2	2		2	2		
AMMO MAN	32	21	2	2		2	2		24
PLT CMDR D	1	22				1			
PLT SGT	1	23		1					
MSGR R/O	1	24		1					
MSGR/DRVR	2	25				1			1
SECT LDR	1	26			1				
GUNNER	8	27			4			4	
A GUNNER	8	28			4			4	
SECT LDR	1	29				1			
GUNNER	8	30	4			4			
A GUNNER	8	31	4			4			
SECT LDR	1	32					1		
GUNNER	8	33		4			4		
A GUNNER	8	34		4			4		
TOTAL	146		21	25	10	25	21	8	36

Figure III-25 - Personnel Essential Teams for the Weapons Company

Figure III-26 presents the essential materiel requirements for each essential fire support team of the weapons company. The materiel teams are organized in the same manner as the personnel teams and, when combined, provide each team with the necessary individual and crew served weapons and equipment to perform required tasks.

				ESSENTIAL MATERIEL TEAMS						
MATERIEL		T/E	NO	1	2	3	4	5	6	IR
CO HQ	M16	3	1				1			2
	PRC 77	2	2		1					1
	M151	2	3		1					1
81mm PLATOON	M16	3	4	1	1		1			
	PRC 77	1	5	1						
	M151	1	6	1						
	M16	16	7	3	2		3	3		5
	M274	8	8	1	1		1	1		4
	M16	66	9	6	6		6	6		42
	81mm	8	10	2	2		2	2		
DRAGON PLATOON	M16	3	11		1		1			1
	PRC 77	1	12		1					
	M151	2	13				1			1
	M16	16	14			8			8	
	Dragon	8	15			4			4	
	M16	16	16	8			8			
	Dragon	8	17	4			4			
	M16	16	18		8			8		
	Dragon	8	19		4			4		

Figure III-26 - Materiel Requirements for Essential Fire Support Teams

- *Effectiveness Analysis*

Examination of effectiveness curves reveal that the weapons company may receive slightly more than 20% personnel casualties and reconstitute to the minimum of three teams within four hours or less. In comparison with supported units (the rifle companies), the weapons company recovered faster

but to a lower level of capability for all casualty levels. The reduced level of unit capability for a weapons company in comparison to the rifle company was not considered as serious as it first seemed. Several factors indicated that degradation will not take place in the same fashion as for a rifle company.

First, the mortar platoon is normally employed in harder positions (in comparison with the rifle companies) and, therefore, would receive correspondingly fewer casualties. Secondly, the DRAGON sections are often attached to the forward rifle companies subjecting them to the same level of enemy fire received by the supported company but with correspondingly more personnel available in each team to assume the antitank function as the need arises. Also, as noted above, the weapons company recovered its essential personnel teams faster than the rifle company (two hours versus three hours for ten percent casualty levels). This was attributed to the fact that the initial functional shock to the weapons company was less than that for the rifle company.

The weapons company received more than double the expected level of materiel damage and still reconstituted above the three team essential level. When increasing levels of personnel casualties were combined with expected materiel damage, the results indicated that the weapons company can only recover the minimal required unit capability if personnel

casualties do not significantly exceed twenty percent. It was not apparent that recovery of weapons company effectiveness was dominated by either personnel or materiel factors. In fact, it appeared that both played about an equally significant role in the formation of essential teams and, therefore, the weapons company possessed relatively sound balance. Figure III-27 shows that neither personnel nor equipment teams fell beneath the required level until degradation (of both at an equal rate) approached thirty percent.

- *Chokepoint Analysis*

While the model made fifty attempts to build weapons companies, leadership billets were repeatedly identified as chokepoints; additionally, the ammunition technician emerged as critical. Vital equipment early in the process of reconstitution were radios and the 81mm mortar. Figures III-28 and III-29 recap personnel and equipment chokepoints.

- *Factorial Analysis*

The factors suggested for improvement of unit effectiveness were: the addition of two PRC-77 radios, the addition of two 81mm mortars, cross training of personnel (ammunition NCO's) to perform the ammunition technician's functions, and improvement of transferability into leadership billets. Comparison of the modified company's effectiveness curves with those analyzed earlier showed improvement at every level of personnel

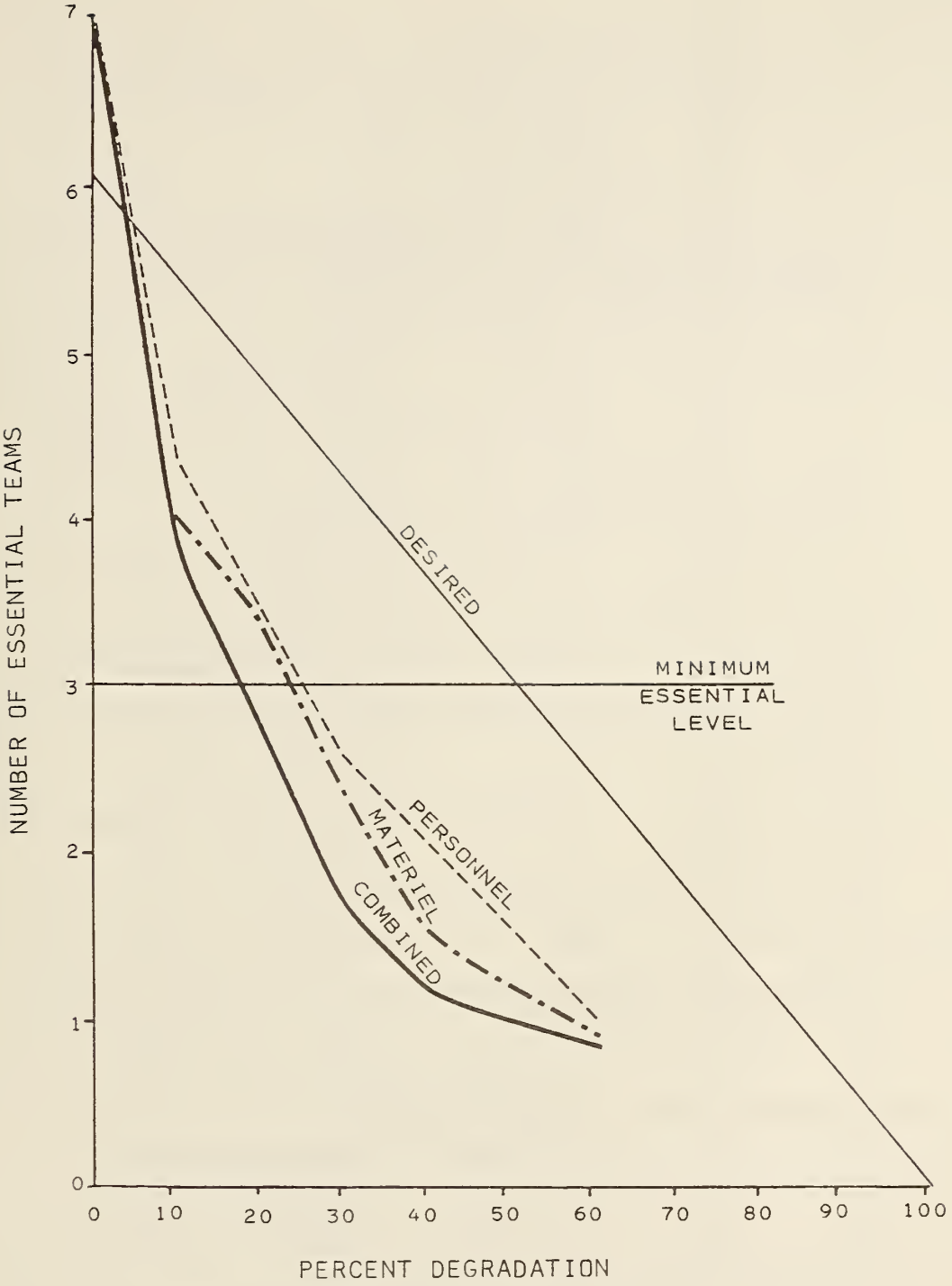


Figure III-27 - Weapons Company Attack (Sustained)-
Equal Degradation of Personnel and Materiel

Pers Cas Level	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr Tries	Specific Chokepoint(s)
10%	4	2	5	Ammo Tech
		5	3	Platoon Sergeant, Section Leader, Gunner, Asst Gunner
		6	40	Platoon Sergeant, Section Leader, Gunner, Asst Gunner
20%	4	2	3	Company Commander, Ammo Tech
		5	2	Platoon Sergeant, Section Leader, Gunner Asst Gunner
		6	40	Platoon Sergeant, Section Leader, Gunner Asst Gunner
30%	2	2	20	Company Commander, Ammo Tech, Platoon Sergeant
		4	7	Supply Sergeant, Platoon Sergeant, Section Leader, Gunner, Asst Gunner
		5	20	Forward Observer, Squad Leader, Platoon Sergeant, Section Leader, Gunner, Asst Gunner
40%	1	2	28	Company Commander, Operations Chief, Ammo Tech, Platoon Sergeant, Msgr Radio Op
		3	2	Gunner, Asst Gunner
		4	20	Company Commander, Supply Sergeant, Platoon Commander, Platoon Sergeant, Section Leader, Gunner, Asst Gunner

Figure III-28 - Personnel Chokepoints

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr Tries	Specific Chokepoint(s)
Half Expected Level	5	2	2	PRC-77
		5	15	81mm Mortar
		6	4	DRAGON
Expected Level	4	2	2	PRC-77
		4	3	81mm Mortar
		5	20	81mm Mortar
		6	3	DRAGON
Double Expected Level	3	2	7	PRC-77
		4	8	81mm Mortar
		5	25	81mm Mortar
		6	2	DRAGON

Figure III-29 - Materiel Chokepoints

loss with expected damage. Next, analysis was conducted to estimate the extent each factor actually modified unit effectiveness.

The factorial analysis was conducted on the combined teams unit effectiveness curves for personnel casualty levels at twenty percent and expected materiel damage. The results showed that, except for the PRC-77 radio, all factors contributed significantly to the total increase in unit effectiveness. Were all factors implemented concurrently within the weapons company, the recoverable unit capability would be increased by over two essential combined teams when compared to the baseline weapons company. There were no significant interactions when the improvements were applied to the company in pairs.

• *Summary and Conclusions*

- The weapons company, as presently organized, is only marginally able to recover from combat degradation in that it cannot maintain more than the minimum number of essential teams with slightly over twenty percent personnel casualties.

- The weapons company is resilient in terms of materiel.

- The initial functional shock after receiving combat losses is less for the weapons company than for a rifle company, and the recovery rate is correspondingly higher.

- Unit effectiveness can be improved by increasing the fill rate of leadership vacancies, adding extra radios, and increasing the total mortar assets of the company by two.

Headquarters and Service Company

• *Minimum Essential Teams*

Essential personnel requirements for the H & S Company were based upon the need for the Company to support at least the essential elements of the maneuver companies and a slice of the weapons company.

Accordingly, the first essential support team provides communications support to the first essential rifle company, while the second provides for the tactical command post, air support, liaison officers, communication support, and limited administrative and logistical support necessary to support two essential rifle companies and essential weapons company in

their sustained attack missions. The third essential support team provides the essential communications and logistical support for the third essential rifle company team which was considered to have a reserve role. Reconstitution of the first three teams, then, would provide the battalion commander with the minimally required infantry battalion. Essential teams 4, 5, and 6 include personnel skills to supplement the marginally required infantry battalion. Team 4 provides increased communications support; team 5 provides the personnel for the main command post, as measured by supplemental increments of communications, administrative and logistical support, and the target acquisition capability of the battalion; while team 6 provides the basic mess facilities. The internal reserve constitutes the remaining personnel from the full T/O of the H&S Company.

The materiel essential teams were organized for combat in the same manner as the personnel teams and, when combined, provide the necessary equipment and weapons for each personnel element.

Figures III-30 and III-31 list the essential teams composition.

- *Effectiveness Analysis*

As indicated by figure III-32, the effectiveness of the H&S Company degraded faster than was desired but there was better balance between personnel and materiel than was expected.

TASK	T/O	LINE NO	ESSENTIAL PERSONNEL TEAMS 1	2	3	4	5	6	IR
BN CMDR	1	1		1					
BN EXECO	1	2					1		
SGT MAJ	1	3							1
MSGR/ORVR	2	4		1			1		
S-1/ADJ	1	5					1		
ASST ADJ	1	6							1
PER/ADCHF	1	7					1		
CAREER PLN	1	8							1
PERS CHF	1	9							1
A PERS CHF	1	10		1					
PERS CLK	1	11					1		
PERS CLK	3	12					1		2
UO CLK	2	13							2
UD CLK	3	14							3
AOMIN CLK	4	15		1			2		1
AOMIN CLK	5	16		1					2
S-2	1	17		1					
INTEL CHF	1	18					1		
INTEL ASST	1	19					1		
INT DRVR	1	20		1					
S-3	1	21		1					
ASST S-3	1	22					1		
LIAISON O	2	23		1			1		
NBC O	1	24					1		
NBC SPEC	1	25					1		
AIR O	1	26		1					
FAC	2	27		1			1		
OPS CHF	1	28				1			
OPS ASST	1	29		1					
TOPO ORAFT	1	30							1
MSGR/DRVR	1	31		1					
S-4	1	32			1				
MMO	1	33							1
MM CHF	1	34					1		
EMBR ASST	1	35							1
AMMO TECH	1	36					1		
LOG CLK	1	37					1		
CO CMDR	1	38					1		
EXCCO	1	39					1		
FIRST SGT	1	40							1
CO GY SGT	1	41					1		
SUPPLY SGT	1	42						1	
PLT CMDR	1	43		1					
COMM CHF	1	44					1		
RADIO TECH	2	45					2		
GO RADIO REP	1	46					1		
RADIO REP	2	47					1		1
TELE TECH	1	48							1
TTY TECH	1	49					1		
MSG CTR CO	1	50					1		
MSG CTR MN	1	51							1
TTY OPR	1	52					1		

TASK	T/O	LINE NO	ESSENTIAL PERSONNEL TEAMS 1	2	3	4	5	6	IR
MSG MN DRVR	1	53					1		
TTY OP/DRVR	2	54					1		1
WIRE CHIEF	2	55		1			1		
WIREMAN	11	56		1		2	3		5
WIREMAN/DRVR	1	57					1		
RAOIO CHF	1	58					1		
RADIO SUP	1	59					1		
FIELD RO	4	60		2			2		
FIELD RO	12	61	2	2	2	2	2	2	
FLO RO/DRVR	1	62		1					
FIELO RO	1	63		1					
FIELD RO	1	64		1					
FLD RO/DRVR	2	65		2					
FIELD RO	2	66		1			1		
FIELD RO	4	67		2			2		
FIELO RO	2	68		1			1		
FIELO RO	1	69				1			
WIREMAN	1	70				1			
FIELO RO	1	71				1			
FIELD RO	8	72	2	2		2	2		
WIREMAN	4	73	1	1		1	1		
PC/SUPO	1	74					1		
SUPPLY CHIEF	1	75		1					
SUP/AOMIN	3	76					1		2
CHF WAR HS	1	77							1
SUP/ADMIN	1	78							1
GEN WAR HS	3	79			1		1		1
SUP/AOMIN	3	80		2			1		
INF REP MN	2	81					1		1
INF REP MN	1	82					1		
MTR	1	83					1		
MT CHIEF	1	84							1
AUTO MECH	2	85		1					1
MV OPR	1	86					1		
AUTO MECH	3	87					2		1
MV OPR	12	88		3			4		5
CHIEF	1	89							1
COOK	1	90							1
COOK	5	91						3	2
BAKER	1	92							1
COOK	10	93						8	2
BAKER	1	94							1
PLT SGT	1	95					1		
RAD TM LOR	4	96							4
RADAR OPR	4	97					4		
NOD OPR	4	98					2		2
CHF SCOUT	1	99				1			
SCOUT	3	100			1		2		
TOTAL	204		5	39	5	12	74	14	55

Figure III-30 - Personnel Essential Teams for H&S Company

			ESSENTIAL MATERIEL TEAMS						
MATERIEL	T/E	NO	1	2	3	4	5	6	1R
M16A1	132	1	1	21	2	4	46	12	46
M203	3	2							
M60 MG	11	3					5		
MRC 8 x 7	1	4		1					
GRC 125	11	5	1	8			1		1
MRC 83A	2	6		1			1		
MRC 109	2	7					1		1
TRC 166	2	8					1		1
PRC 77	58	9	9	14	7	7	8	2	11
PRC 75A	5	10		2			1		2
PRC 47	5	11		2			1		2
GRA 6	12	12		4			2		6
GRA 39A	15	13		3			3		9
SB 3624	5	14		1			1		3
GRR 17	1	15					1		
TA 838	18	16		3			10		5
CP 95A/PD	1	17					1		
TGC 14	2	18					1		1
TA 1/PT	44	19	2	6		8	12		16
M274A2	30	20	4	8	2	2	7		7
M718A1	1	21					1		
M561	7	22		1			4		2
M151A2	20	23	1	10	1		5		3
KIT SM ARM	4	24					2		2
KIT MECH	7	25		2			3		2
KIT COMMON	5	26		1			2		2
KIT M151A2	1	27		1					
KIT M561	1	28					1		
KIT CHEM	6	29	1	1	1		2		1
PPS 15	8	30					4		4
PPS 6	2	31					1		1
TVS 4	4	32					2		2
PVS 4	4	33					2		2

Figure III-31 - Materiel Essential Teams for H&S Company

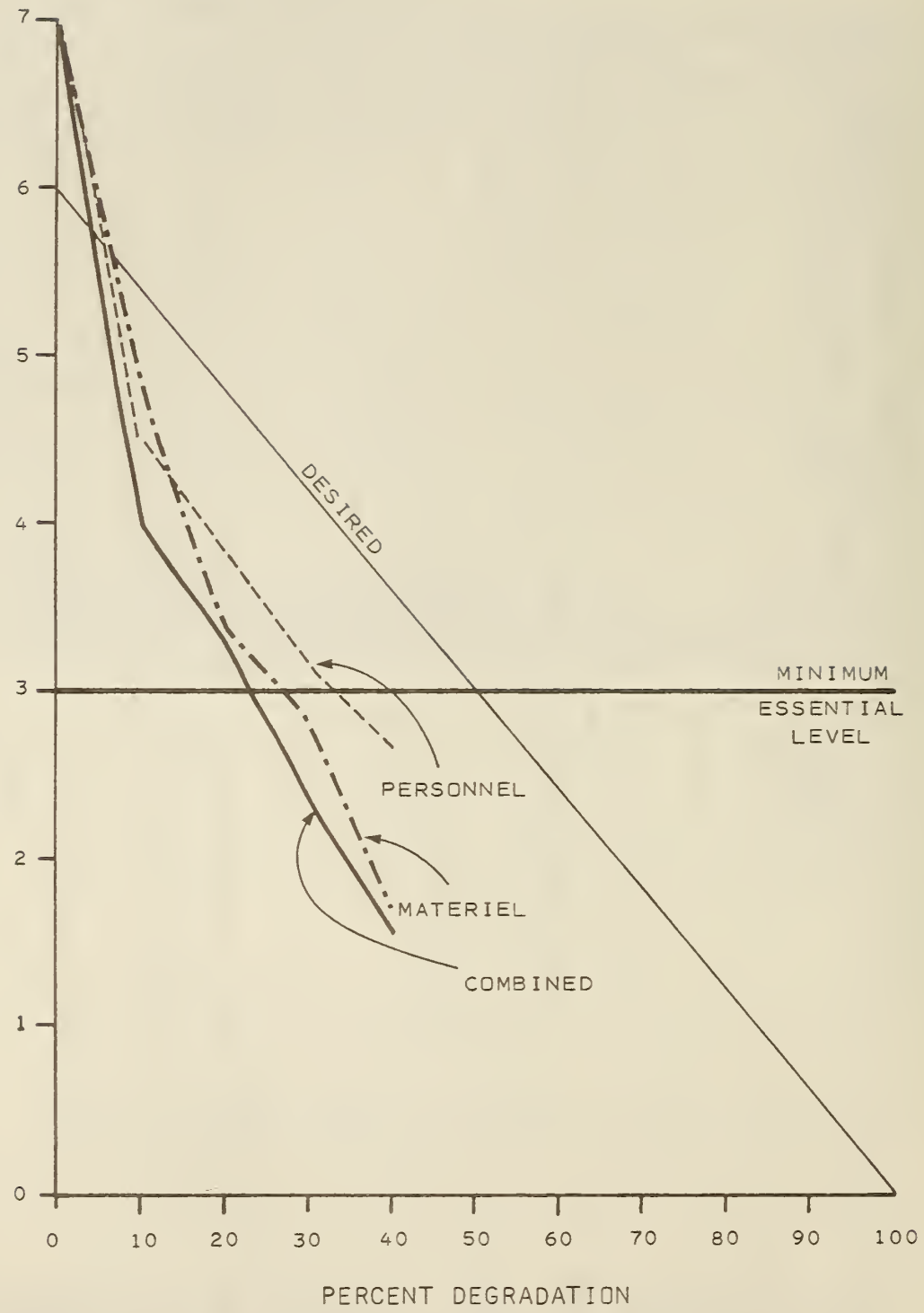


Figure III-32 - Degradation of Personnel and Materiel (H&S Co)

The company was able to reconstitute to the three essential team level within five hours after receiving thirty percent personnel casualties. As casualties grew, recoverability dropped so that at forty percent the company was unable to reach the three team level. Measurement of materiel effectiveness showed that reconstitution of essential teams to the four team level was possible at expected damage rates even with thirty percent personnel losses.

Personnel dominated team rebuilding at every casualty level, but when personnel and equipment losses were viewed in equal increments, personnel dominance ceased at about the twenty percent level. At about the eighteen percent level, materiel began to slightly dominate. Figure III-32 shows the materiel-personnel crossover.

- *Chokepoint Analysis*

Figures III-33 and III-34 highlight personnel and materiel chokepoints during the building of fifty H&S Companies. The chokepoints indicated that field radio operators, radio repairmen, and those personnel involved in close air support functions were critical to the mission of the company. Equipment items that were critical to the lower teams included the M151A2 and M561 tool kits, AN/TGC-14 teletypewriter, AN/GRA-6 and AN/GRA-39A radio remotes, CP-95A/PD radiac computer, and the chemical detector kit.

Pers Cas Level	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr Tries	Specific Chokepoint(s)
10%	5	5	20	Forward Air Controllers Field Radio Operators Radio Repairmen
		6	24	Field Radio Operators
20%	4	4	3	Field Radio Operators
		5	46	Air Officer Forward Air Controllers Radio Repairmen Field Radio Operators Wiremen
		2	6	Air Officer Forward Air Controllers
30%	4	4	6	Field Radio Operators
		5	35	Almost all billets
		2	5	Air Officer Forward Air Controllers
40%	3	3	3	Field Radio Operators
		4	30	Field Radio Operators
		5	8	Almost all billets

Figure III-33 - Personnel Chokepoints

Materiel Damage	Avg Teams in 50 Tries	CHOKEPOINT SUMMARY		
		Team	Nr Tries	Specific Chokepoint(s)
Half Expected Level	6	2	1	Tool kit (M151A2)
		5	4	Radio Computer Teletypewriter Tool kit (M561) Chemical Detector Kit
		7	40	Most materiel
Expected Level	5	2	3	Tool kit (M151A2)
		3	1	Chemical Detector Kit
		5	23	Radio Remote (GRA-6) Radio Remote (GRA-39A) Radio Computer Teletypewriter
		7	20	Most materiel
Half Expected Level	2	2	45	Radio Remote (GRA-6) Radio Remote (GRA-39A) Tool kit (M151A2)
		5	3	Radio Remote (GRA-6) Radio Remote (GRA-39A) TA-838 Chemical Detector Kit

Figure III-34 - Materiel Chokepoints

• *Factorial Analysis*

Review of the effectiveness curves and chokepoints suggested the following modifications to the current H&S Company:

- Reduce the criticality of the air officer and forward air controller billets by training infantry officers in those skills.

- Increase radio maintenance capabilities by cross training radio technicians and repairmen to ensure continuous maintenance ability even if at a degraded level.

- Improve transferability into field radio operator billets by increased cross training.

- Increase the reliability of the AN/GRA-6 and AN/GRA-39A radio remotes by substituting another item of equipment. The characteristics of the HYX-57 radio remote were used in the model to examine the impact of such a change.

- In similar fashion, improve the speed, reliability, and operability of the AN/TGC-14 through modernization.

The personnel and materiel data used by the model were adjusted to reflect the above modifications, and the company was re-examined. The only change that did not significantly add to effectiveness was cross training to improve radio maintainability by increasing the number of persons able to maintain radio equipment (other than items needing cross

training). The remaining factors produced a cumulative capability to reconstitute more than two additional teams at the twenty percent casualty level with expected damage. Figure III-35 summarizes the effect of individual adjustments over time.

Factor	Improvement Over Unadjusted Company in Number of Teams		
	4 Hours	8 Hours	10+ Hours
Improved Radio Remotes	.37	.43	.41
Improved Teletypewriter	.27	.3	.27
Transferability of Radio Operators	.49	.92	1.3
Infantry Officers as FAC/AO	.55	.63	.24
Cross Training Radio Repairmen	N/A	N/A	N/A

Figure III-35 - Factorial Analysis Results

- *Summary and Conclusions*

- As currently organized, H&S Company is effective in that it can still perform its minimal requisite support functions after receiving more than thirty percent personnel casualties and an expected level of materiel damage.

- Reconstitution of H&S Company effectiveness is in large part constrained by the billets of air officer,

forward air controller, field radio operator, and radio repairman.

- Effectiveness can be enhanced by improving the transferability of infantry officers into FAC/AO positions. The supporting arms observer concept of the Marine Integrated Fire and Air Support System (MIFASS) also addresses this topic.

- Certain equipment items could be improved/replaced with a positive impact on unit effectiveness.

- The value of increased cross training and leadership training is not as valid in H&S Company as it appeared to be in the rifle/weapons companies. The relatively high degree of specialization and need for continuity characteristic of the H&S table of organization limits the otherwise beneficial aspects of personnel transferability.

Review

- *Summary*

For purposes of this analysis, unit effectiveness was considered to be the measure of a unit's ability to reconstitute after personnel/equipment degradation. Using the computer model, AMORE, unit effectiveness curves which displayed recovery rates and levels were prepared. Units which were able to reconstitute a certain level of combat effectiveness after losses occurred were considered satisfactory. Chokepoint and factorial analyses of possible alternative structures were also conducted to elaborate on the first conclusions.

In brief, a major conclusion of this effort was that traditional Marine infantry organizational concepts are quite sound in terms of organizational efficiency. Although the examination produced satisfactory results for almost every infantry battalion module which was analyzed, it also suggested areas for improvement in each. With the one exception of the weapons platoon (sustained operations), all units were able to reconstitute a satisfactory number of essential personnel teams. Some materiel improvements were indicated for the rifle company. Perhaps the greatest insight gained from the analysis was an appreciation of the value and need for cross training in certain billets, especially DRAGON gunners and fire/air control personnel. Figure III-36 summarizes these and other observations.

UNIT	Increase Leadership Training	Increase Cross Training	Add Radios	M16/203 Ratio	Add Mortars	Improve Comm Eqpt
Rifle Platoon	X		X	X		
Weapons Platoon	X		X		X	
Rifle Company	X	X	X	X		
Weapons Company	X	X			X	
H & S Company		X				X

Figure III-36 - Summary of Potential Improvements

- *Readiness*

As an extra facet in examining the effects of casualty and equipment losses on organizational efficiency, the question of unit readiness was reviewed using the AMORE model. A complete battalion was considered, and examination criteria were set at three levels as follows:

Level I - 90% of T/O strength
85% rank/MOS match for sergeants and above
90% essential materiel operational

Level II - 80% of T/O strength
75% rank/MOS match for sergeants and above
80% essential materiel operational

Level III - 70% of T/O strength
65% rank/MOS match for sergeants and above
70% essential materiel operational

Each of the three levels shown above was compared with the essential personnel/essential materiel teams used in the AMORE model. Very little correlation between the two sets of criteria was detected. The model indicated that unit effectiveness measured in terms of essential teams was consistently lower than the effectiveness level hinted at by gross indicators such as on board personnel strength percentages. Differences were as summarized in figure III-37.

Readiness Level...	Was Indicated by...	But recovery capability ranged from...	
		As low as...	To a max of only...
I	90% Pers 85% MOS/Gd 90% Mat'l	17%	83%
II	80% Pers 75% MOS/Gd 80% Mat'l	17%	67%
III	70% Pers 65% MOS/Gd 70% Mat'l	0%	67%

Figure III-37 - Readiness Evaluation

The results displayed in figure III-37 suggest that any technique for evaluating unit readiness should consider the very important aspect of the effect on readiness of organizational efficiency. The criteria chosen for comparison inflated unit readiness when it was measured in terms of recoverability. A conclusion can be formed that readiness criteria which use gross assessments as a base are less valid indicators than other techniques might provide. Criteria which tie critical personnel skills to staffing levels, and essential operable materiel items to authorized equipment numbers appear to have the potential for providing a meaningful measure of a unit's effectiveness (readiness) for combat. It is suggested that this question be examined separately in greater detail.

IIIB. WARGAMING

Background and Objectives

Wargaming was adopted to support the analysis of effects of organizational structure upon combat effectiveness. A game was designed to compare a three rifle company structure against a four rifle company structure. This analytical method also tested the characteristics of tactical mobility, maneuver, and firepower related to the organizational design of the infantry battalion.

The wargame designed for the infantry battalion study was a first-generation effort that involved manual, computer-assisted play by its participants. The game was a two-sided kinematic analysis that played a Marine infantry battalion (blue element) versus a battalion portion of a Soviet Motorized Rifle Division (MRD) (red element).

The wargame allowed free play by the blue element within a defined area of operations. A scenario initialized the blue and red elements into their adversary relationship. Predetermined routes of advance for the red element enhanced the scenario's schematic development. Computer assistance via an intervisibility model, contracted from Potomac General Research Group, was the facilitating mechanism to drive the wargame. The intervisibility model provided line-of-sight data used to generate target arrays within the defined area of operations. The red element followed a predetermined route of advance while

the blue element was allowed to maneuver. Engagements depended upon the line-of-sight data that was developed. That is, if a blue player maneuvered to selected grid coordinates and encountered red targets by direct line-of-sight, engagements were allowed. Engagements caused attrition to the blue and red elements according to probability tables for the different weapons systems used. The wargame continued through a series of ten engagements. Data sheets were maintained to provide the cumulative accounting of blue and red attrition. This data was then analyzed to compare the effects of a three-rifle-company battalion against a four-rifle-company battalion.

For purposes of this study, the wargame was completed by six Marine officers. All players were lieutenant colonels and had combat experience as infantry officers. Three of the participants (from FMF organizations) recently commanded or presently command Marine infantry battalions. The experience factor derived from the players' backgrounds lends greater validity to the results obtained from the wargame.

Methodology

The game created an adversary relationship for any number of constructive blue elements that could be individually tested against a defined red element. It was a game of maneuver and attrition and was closely controlled to retain its analytical nature. The constraints imposed through selected rules and procedures controlled the engagements of targets by both the

blue and red elements. The blue element was synthesized from several candidate structures. A representative four-rifle-company structure was constructed. Each structure contained a similar weapons company. Figure III-38 illustrates the basic form of the blue elements. The wargame was used to measure and compare the two structures, i.e., the three-company versus four-company battalions, in the areas of tactical mobility, maneuver, and firepower. The data produced by the wargame was used to analyze the total combat effectiveness of the two candidate structures.

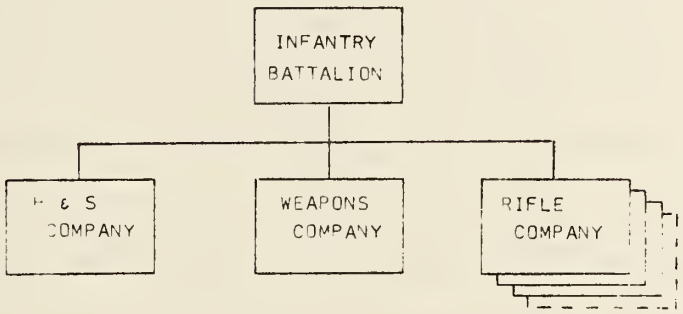


Figure III-38 - Typical Structure of Blue Elements

The general methodology was to create engagements of red forces through maneuvering of blue elements into weapons effectiveness range; assign attrition factors to the blue and red units based on probability-of-kill tables; and analyze the attrition data, unit movements, and weapons applied against various targets to allow deductions of overall combat

effectiveness. Based on this general methodology, wargame design focused on creating a reasonable combat environment.

An area of operations was selected in Denmark, near the town of Varde (map series M715, sheet 1113 IV). UTM grids are 622610 (lower left), 622674 (upper left), 685674 (upper right), and 685610 (lower right). The terrain within the area had been reduced to digitized data and was already available on a computer file. The terrain was digitized for each 100 meter by 100 meter segment of the total matrix. Computer listings were produced for each digitized point to provide 4,032 observer points from which line-of-sight information could be developed. In designing the wargame, the utility of having the entire spectrum of observer points was considered minimal. Therefore, for each grid within the gaming area twelve representative observer points were selected. This provided a more manageable total of 432 observer points for use by controllers during the wargame. Figure III-39 is an index to line-of-sight blocks used for the game. The twelve observation points are resident within each index block. An example of the computer listing for a selected observation point is shown in figure III-40. The observer point is denoted by the "O" and is resident in index block 2,3. All points denoted with an "X" define line-of-sight visibility from the observer point to that point. An area that is void of an "X" cannot be seen from the observer point. A referencing template was used to correlate the

1,6	2,6	3,6	4,6	5,6	6,6
1,5	2,5	3,5	4,5	5,5	6,5
1,4	2,4	3,4	4,4	5,4	6,4
1,3	2,3	3,3	4,3	5,3	6,3
1,2	2,2	3,2	4,2	5,2	6,2
1,1	2,1	3,1	4,1	5,1	6,1

Figure III-39 - Index to Line-of-Sight Blocks

Southwest corner of area is 55°35'47"N 80°24'00"E

Reference: Army Map Service Series M715, Sheets 1113 III and 1113 IV 1:50,000

Figure III-40 - Computer-Produced Line-of-Sight Index

line-of-sight information with grid coordinates on the map sheet. In this manner, whenever a blue player positioned a maneuver element anywhere within the gaming area, the line-of-sight to other points within that area could readily be determined. A rule of the wargame was then applied: If a blue player could see a target within the target array that was developed from the red route of advance, that target could be engaged. Direct fire weapons could be employed only with

line-of-sight to the target (with consideration to weapons effectiveness ranges). Indirect fire weapons could be used without line-of-sight to the target if there were observer-adjusted fires directed from some blue maneuver element with line-of-sight visibility.

The scenario for the wargame was completed by writing a general situation and a special situation for the blue element. A mission was given to the blue element in the special situation. To prepare the blue player for execution of the wargame, an intelligence summary was also provided. The game was started by requiring the blue player(s) to describe their landing plan for a helicopterborne assault into the gaming area. Landing zones that were predetermined in the game's design had to be used (this was a control mechanism). The four LZ's that could be used were located as follows: LZ 1, grid coordinates 627670; LZ 2, grid coordinates 625655; LZ 3, grid coordinates 632645, and LZ 4, grid coordinates 627626. Figure III-41 outlines the wargame's area of operations and shows the four landing zones.

Orders of battle for the blue and red elements were provided to the blue players. The blue element consisted of the two possible structures. Battalion A was an infantry battalion that had three rifle companies and a weapons company. Battalion B was an infantry battalion that had four rifle companies and a weapons company. To completely play the wargame,

Figures III-41 - Wargame Area Showing Landing Zones

each blue participant had to complete ten movements with both structures unless the intensity and timing of engagements forced premature termination of play.

The red order of battle described a Motorized Rifle Battalion (MRB) that would be typical of opposing force employment. The MRB is a detailed representation derived from current field manuals. To control the maneuver of the red element, two routes of advance were used. These predetermined routes deployed the red element throughout the course of the game to provide changing target arrays for the blue players. The red element consisted of a combat reconnaissance patrol, an advance party, and a vanguard main force. The red routes of advance followed a series of ten increments of movement to coincide with the ten plays possible for the blue elements. For each movement by the blue element, ten different target arrays could be produced from the red element's route of advance. The exact targets were dependent upon line-of-sight determinations for each possible target witn the total target array.

To play the wargame, two people were required. The blue element was controlled by the blue battalion commander. Experienced infantry officers participated in that role. Each commander maneuvered his battalion according to a self-generated scheme of maneuver and fire support plan. Decisions on target engagements were made by blue battalion commanders based on target arrays developed and delivered by controllers

according to each blue element's movement. The controller's responsibilities also included providing intelligence information to participants, controlling the game's ten sequences (defined as "moments"), monitoring blue movements, and assessing attrition rates for blue and red elements (these were derived from look-up tables for probabilities-of-kill).

Conduct of the Wargame

Since it is manual, the wargame required significant man-hours to play. The bulk of the man-hours were required from the controllers; battalion commanders were required only to make decisions based on data presented to them by the controllers. For the twelve plays of the wargame (each player participated in two iterations of the wargame activity schedule with different battalion structures used in each iteration) variations were applied to measure the effects of supporting arms and increased firepower. The players were divided into two groups of three players each. Group A completed the wargame with the constructive battalions and no supporting arms. The weapons company used in this series of plays contained two sections of Dragon antitank missiles. Group B used the same constructive battalions with a weapons company that contained four sections of Dragon antitank missiles. Supporting arms included a battery of 105mm howitzers, a section of TOW missiles, and an air defense section of Redeye missile teams. Since the wargame pitted a basically footmobile blue force

against a highly mobile, mechanized red battalion, the principal elements for analysis were selected as: maneuver, tactical mobility, and firepower.

Figure III-42 shows the scheduling of structures for the individual participants. Figure III-43 is a matrix that recapitulates the frequency of play for each structure. Game design included the variance of battalion structure against a differing route of advance to dampen the effects of a "learning curve" for each blue player's second iteration of the wargame.

SEQUENCE OF WARGAME PLAY

Player 1	Bn A vs RR1
	Bn B vs RR2
Player 2	Bn B vs RR1
	Bn A vs RR2
Player 3	Bn A vs RR1
	Bn B vs RR2
Player 4	Bn B vs RR1
	Bn A vs RR2
Player 5	Bn B vs RR2
	Bn A vs RR1
Player 6	Bn B vs RR1
	Bn A vs RR2

Legend: Bn A - 3 Rifle Company Structure
Bn B - 4 Rifle Company Structure
RR1 - Red Route of Advance 1
RR2 - Red Route of Advance 2

Figure III-42 - Wargame Sequence

		ROUTES OF ADVANCE		TOTAL
		RR1	RR2	
STRUCTURE	BN A	3	3	6
	BN B	3	3	6
	TOTAL	6	6	12

Figure III-43 - Recap of Play/Structure Frequency

Controllers used the wargame activity schedule to supervise play. Each controller was provided with supporting documentation not available to the players. This information contained detailed breakdowns of the blue and red elements, data sheets, target array generation tables, and tables of probability-of-kill for different infantry battalion weapons.

As the wargame was played, the controller was required to maintain a concise data sheet that tabulated blue maneuver elements movement, engagements that were made, and the levels of attrition that were assessed following each engagement. As a further means of control, the controller applied specific rules and procedures for each participant. Figure III-44 summarizes these rules and procedures. To complete the data form the maneuver elements for blue were divided into "fire modules." This segmentation of the rifle company considered a rifle

WARGAMING RULES AND PROCEDURES

1. Initial insertion of the blue element is by helo-lift. Helicopter support is not available for unit movement within the gaming area. Extraction of maneuver elements is available on a one-time basis.

2. Supporting arms are employed dependent upon the scenario played. Requests for additional supporting arms will be denied. However, any requests made will be annotated on the data forms by the controller.

3. Rate of advance for blue and red elements is constrained to 2 km per hour.

4. A game "moment" is 30 minutes (constructive) in duration. Therefore, a maneuver element can advance up to 1000 meters.

5. Direct line-of-sight to a target is required for engaging with direct fire weapons. If line-of-sight to a target is maintained by a maneuver element, observer-adjusted fires can be made from indirect fire weapons that may or may not have line-of-sight to the target.

6. If a blue "fire module" engages any red "target module," it is expected that return fires can be made from any "target modules" within weapons effectiveness range.

7. To create an engagement, blue must initiate fires upon the "target module." If a red element closes to within 500 meters of a blue element, and no engagement has been declared by blue, an engagement by red will be initiated.

8. More than one "target module" can be engaged by blue consistent with organic or attached weapons availability and weapons effectiveness ranges. The blue player must specify exact weapons designation for a multiple target engagement. If only one "target module" is engaged, all organic weapons of the "fire module" will be assumed utilized in the engagement if within weapons effectiveness range.

Figure III-44 - Wargame Rules

platoon plus a constructive one-third of the weapons platoon as a fire module. Fire modules for the weapons company were defined at the individual section level. The blue battalion commander was required to maneuver the blue element only to the company level; the division of the blue element into smaller fire modules was done by controllers to facilitate precise accounting of attrition data. Similarly, the red element was also subdivided into target modules. This sub-division enhanced the accountability of attrition data and was derived from the natural employment of the red force in its route of advance.

The principal control mechanism of the wargame was created by sequencing the game into ten time periods previously termed moments. A "moment" represented a 30-minute time period. The rate of advance for blue and red elements was constrained by that time factor. The rate of advance was defined as 2,000 meters per hour, i.e., 1,000 meters per "moment."

Data Resolution and Analysis

Data forms were fabricated to record and accumulate quantitative and tangible actions by blue participants. At the completion of the entire series of game iterations the data forms were tabulated and grouped with reference to individual player and to the synthesized battalion structure. Since the blue and red elements had been assigned weighted unit values for the defined "fire" and "target" modules, tabulation of

player actions could be assembled to present comparative statistics for player-versus-player and structure-versus-structure. Data reduction concentrated upon categorizing data under structure types. As the data was analyzed, methods of employment of blue elements became a derivative statistic with quantifiable value.

Four topics that provided analytical significance were produced from the data: average movement of maneuver elements, attrition of blue and red elements relative to mobility, change in ratio of red firepower to blue firepower, and comparative frequency of usage for antitank weapons in centralized and decentralized modes of employment. Additionally, results of gaming produced numerous inferences that were of interest, but lacked the frequency of occurence required to have statistical significance.

- *Average Movement of Maneuver Elements*

The blue battalion commander was required to position his maneuver elements to the company level in a sequential, moment-to-moment manner. At game's completion, a composite diagram of blue movement was constructed.

From the composite diagram, the total movement for each company was plotted and computed in total meters traversed. Figure III-45 is a bar-graph of total movement by maneuver elements. By averaging the maneuver elements' movement, each player's average movement of a battalion was computed. Grouping

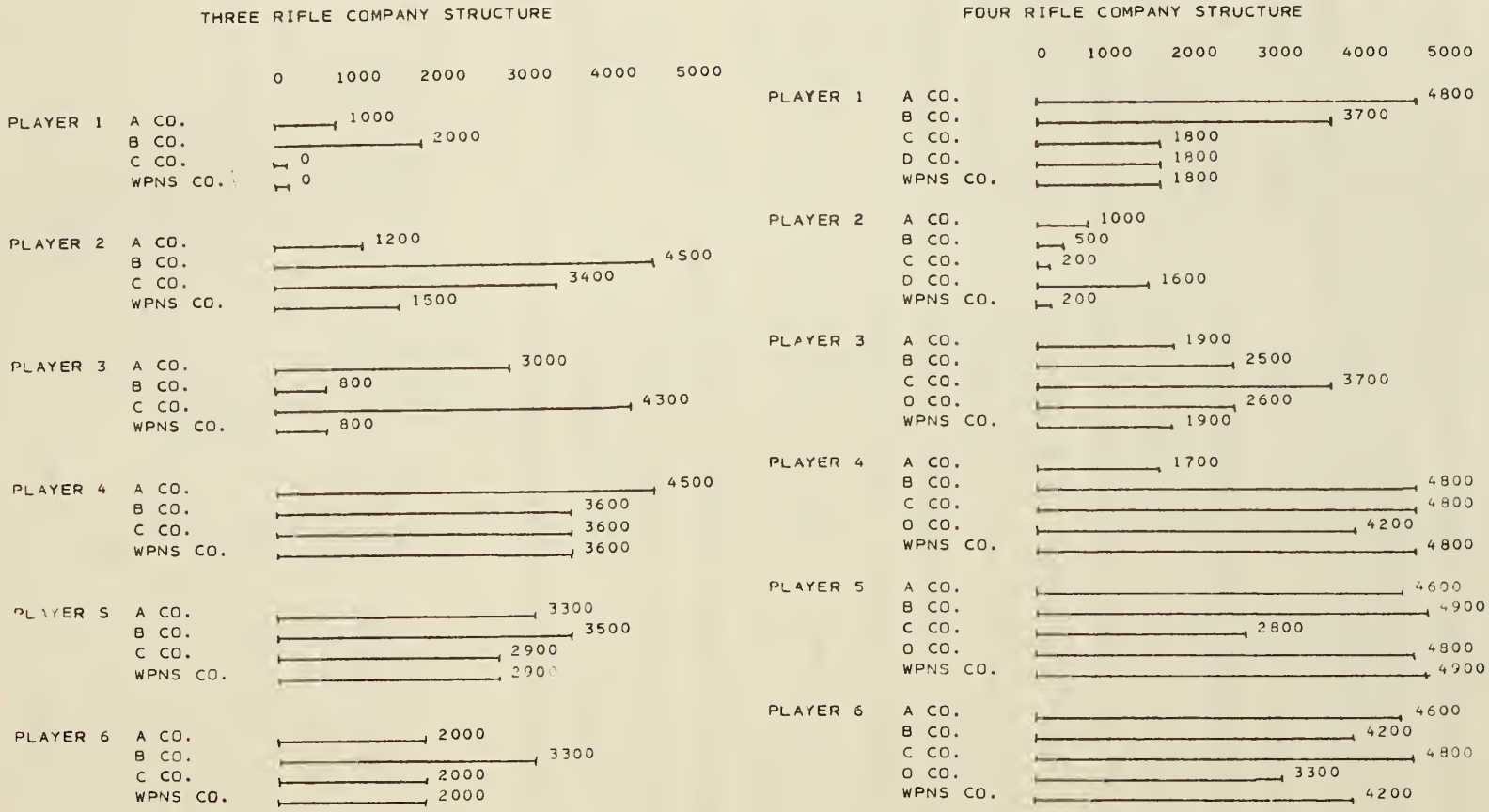


Figure III-45 - Total Movement of Maneuver Elements

like-battalion structures together, an average of the player's average movements produced the mean value for the battalion structure's movement. This statistic was used to compare the three rifle company structure against the four rifle company structure. Figure III-46 presents a summary of these values. The four company structure was maneuvered in larger increments (by 25% more). An interesting observation is that in each case the weapons company's movement correlated directly to

	3 RIFLE CO STRUCTURE	4 RIFLE CO STRUCTURE
PLAYER 1	750M	2780M
PLAYER 2	2650M	700M
PLAYER 3	2225M	2520M
PLAYER 4	3825M	4060M
PLAYER 5	3150M	4400M
PLAYER 6	2325M	4220M
AVG MOVEMENT	2487.5M	3113.3M

Figure III-46 - Average Movement of Maneuver Elements

one rifle company's movement. This observation suggests a conclusion that, regardless of the number of rifle companies, *a rifle company will be utilized in a role as a battalion reserve, and security element for the weapons company. The remaining rifle companies are used as the primary maneuver elements.*

- *Attrition of Blue and Red Elements Relative to Mobility*

In designing the game the segmenting of the blue and red elements into modules contributed to successfully maintaining

accountability of attrition assessments. The data forms for each player were examined for module attrition on a moment-to-moment basis. The percentage of the fire modules and the target modules remaining at a moment's completion was computed and transcribed to a cumulative table. This information was used to calculate weighted unit values for the individual modules as measured by assessed attrition. Thus, a weighted unit value to measure the firepower lost and remaining for each iteration of the wargame could be computed for each battalion structure.

To relate attrition to mobility, each individual iteration of the game was categorized as either a static or mobile method of battalion employment. Referring back to figures III-45 and III-46, an arbitrary categorization of a battalion as static was made if a player's average movement was 2500 meters or less. While grouping the twelve plays of the wargame into static and mobile categories and retaining separation of three and four rifle company structures, the percentage of attrition within each category was calculated on an average basis. These calculations are shown in figure III-47. To reflect the percentage change of blue attrition to red attrition, relative to mobility, computations of these data points produced the comparative statistics in figure III-48. According to these data, *the four rifle company structure sustained the least attrition in both static and mobile cases.*

CATEGORY	RESULTS	3 RIFLE COS	4 RIFLE COS
STATIC	BLUE ATTRITION	60%	45%
	RED ATTRITION	47%	38%
MOBILE	BLUE ATTRITION	61%	65%
	RED ATTRITION	49%	59%

Figure III-47 - Attrition of Blue and Red Elements Relative to Mobility

CATEGORY	3 RIFLE COS	4 RIFLE COS
STATIC	22%	16%
MOBILE	20%	9%

Figure III-48 - Percentage Change of Blue Attrition to Red Attrition - Relative to Mobility

Change in Ratio of Red Firepower to Blue Firepower

Since the weighted unit value computed for blue and red elements was tabulated for each iteration of the game on a moment-to-moment basis, a comparision of the firepower values of the adversaries was made. A firepower ratio was computed by dividing red firepower by blue firepower. Figure III-49 lists the ratios computed for each player and moment of the games played. A comparison was made to examine the change of firepower ratio from game's start to completion. Measured as a percentage of change, each application of the game was compared to identify gains or losses in firepower advantage based

Moment-By-Moment Recapitulation

PLAYER	Moment 1	Moment 2	Moment 3	Moment 4	Moment 5	Moment 6	Moment 7	Moment 8	Moment 9	Moment 10
A101	1.63	1.63	1.63	1.63	1.63	1.63	1.56	1.57	1.59	1.50
B201	1.35	1.35	1.35	1.35	0.89	1.17	1.70	--	--	--
A202	1.63	1.63	1.63	2.12	2.99	--	--	--	--	--
B102	1.35	1.35	1.35	1.35	1.35	1.36	1.38	1.53	1.65	1.51
A103	1.63	1.63	1.63	1.63	1.63	1.63	1.71	2.28	3.54	--
B203	1.16	1.16	1.16	1.16	1.16	1.16	1.39	1.71	--	--
A204	1.37	1.37	1.15	1.06	1.33	--	--	--	--	--
B104	1.16	1.16	1.17	1.06	1.22	0.99	--	--	--	--
A105	1.37	1.37	1.25	1.20	1.33	1.46	--	--	--	--
B205	1.16	1.16	1.13	1.30	1.21	1.32	--	--	--	--
A206	1.37	1.37	1.34	1.34	1.34	1.67	1.59	--	--	--
B106	1.16	1.16	1.16	1.14	1.41	1.44	--	--	--	--

Figure III-49 - Firepower Ratios of Red-Blue

on attrition. T ` categorizing by battalion structure and averaging of these ` nges for individual plays produced an overall average change . r the two structures. Figure III-50 summarizes this information. The lower value for a four rifle company structure indicates that as the game was played *there was a lesser degradation of the four company battalion's blue firepower in relation to red's firepower advantage.*

The changes in firepower ratio were treated in a second manner, but valid conclusions could not be obtained. By plotting all of the firepower ratio changes for each moment of all plays of the wargame, where engagements were made, a curve was fitted to the scatter diagram for all points by using least-squares regression. The curve for each of the two

	3 RIFLE CO STRUCTURE	4 RIFLE CO STRUCTURE
PLAYER 1	-8.0%	25.9%
PLAYER 2	83.4%	11.9%
PLAYER 3	117.2%	47.4%
PLAYER 4	-2.9%	-14.7%
PLAYER 5	6.6%	13.8%
PLAYER 6	16.1%	24.1%

$$\text{FIREPOWER RATIO} = \frac{\text{RED FIREPOWER}}{\text{BLUE FIREPOWER}}$$

AVG CHANGE OF FIREPOWER RATIO	34.8%	16.4%

NOTE: LOWER PERCENTAGE OF CHANGE MEANS THAT FIREPOWER RATIO HAD DEGRADED AT A LESSER RATE.

Figure III-50 - Change in Ratio of Red Firepower to Blue Firepower - Infantry Battalion Wargame

structures tested was compared in relation to the slope of the fitted curve. A higher, positive slope would have indicated an improvement of firepower relationship "Y-axis." A small differential in slope was computed; however, so this test was not pursued further. The approach appears to have definite quantitative value but would require a greater number of data points and more plays of the wargame.

- *Comparative Frequency of Usage for Antitank Weapons in Centralized and Decentralized Modes of Employment*

The analysis of the data from the wargame focused on comparative effects of organizational structure in terms of tactical mobility, maneuver, and firepower. With a highly mechanized force pitted against a foot-mobile force, the availability of weapons systems had a significant impact on the blue element's success or lack of success. The employment of TOW and DRAGON antitank systems was analyzed after classifying

their employment into centralized and decentralized modes. Directly from the data forms, the frequency of usage of these systems could be summed, arranged by time interval of occurrence (what moment of the game engagement was made), and classified as centralized (A/T weapons with battalion) or decentralized (A/T weapons with a rifle company). The graph in figure III-51 presents these data. By examination of this graph, interest is directed to the broad spectrum of employment of antitank weapons over time while operating in a decentralized mode and to the early engagement of the decentralized weapons. When centralized, the antitank weapons

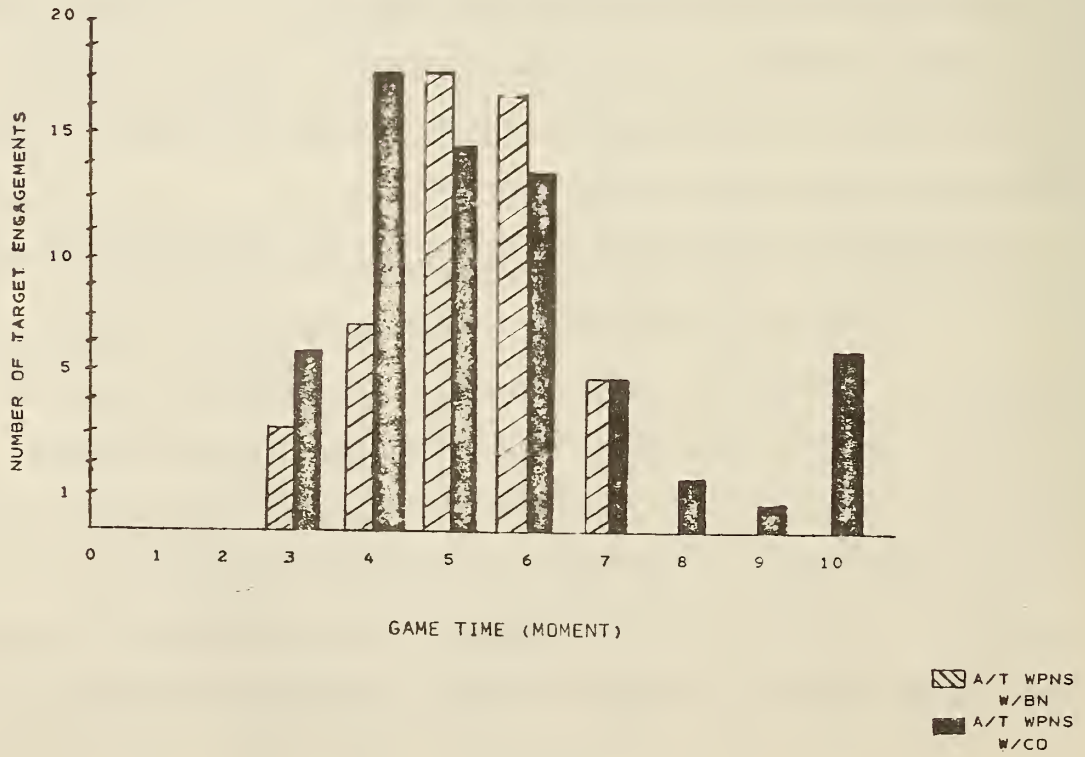


Figure III-51 - A/T Weapons Frequency of Usage

frequency of usage is compressed into a smaller time span approximating a normal distribution. These observations imply that *the foot-mobile force had to engage targets in a less flexible time span when antitank weapons were centralized. The decentralization of the weapons created more engagements earlier in the game and over a greater period of time.*

Conclusions and Observations

The wargame's completion produced definitive results for its assigned objectives. Although a greater number of iterations of the game would be desirable, the twelve iterations that were completed are enough to allow certain conclusions to be stated with propriety.

The four company rifle structure performed better in each test. The addition of a fourth maneuver element allowed the battalion commander to use a plan of attack that created greater movement. When battalions exercised more maneuver, their attrition was less.

This analysis is better stated in summary when the threat of the 1980's is considered. The candidate battalions used in the wargame are derivatives of the present-day Marine infantry battalion. The adversary red element was a derivative, Soviet-styled MRB with normal attached units, and its employment within the wargame was consistent with opposing force doctrine. The red element followed a route of advance that was dedicatedly pursued, and it did not delay advancing to "fight it out" as

blue engaged red. If the battlefield of the 1980's is to incur short, intense conflicts, tactical mobility will be of significant impact on the maneuverability of a battalion. Blending tactical mobility with maneuver and firepower will create the organizational design that will be able to seek out the enemy, create engagements, and sustain engagements. Figure III-52 depicts the outcome that the wargame results suggest--the Marine infantry battalion should be a highly maneuverable and mobile force that can create an engagement, and remain survivable for the greatest duration of time.

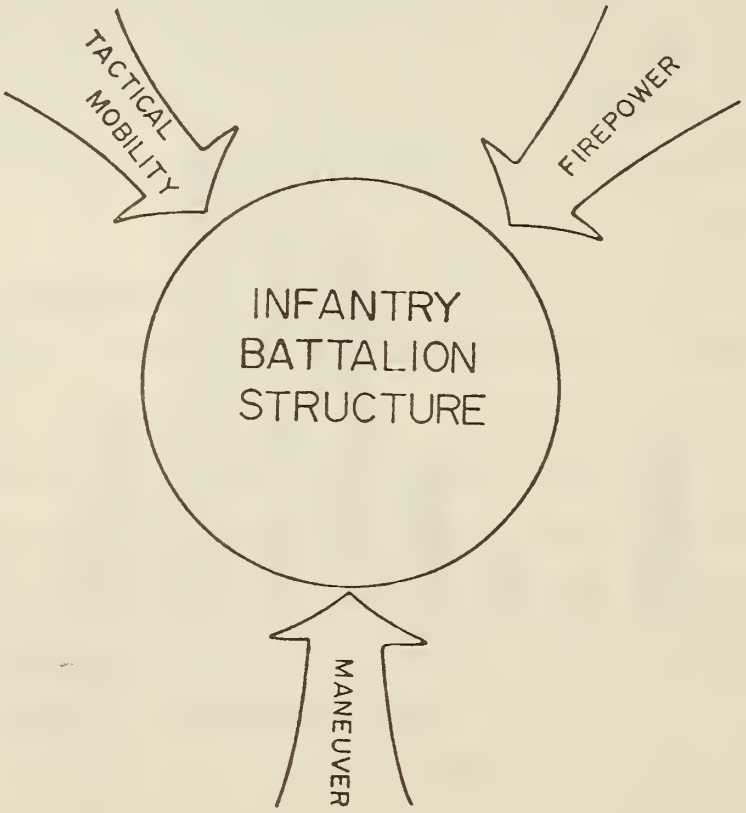


Figure III-52

As the wargame progressed, it was apparent that the players attempted to maneuver the blue elements into positions that would enable friendly engagements. The deficit in tactical mobility severely hindered blue players. Several players, after pursuing a scheme of maneuver, were left "holding the bag" when the red element changed, or did not follow, a predicted route of advance. Often, there was one, and only one, chance to engage a target before it would be out of range for organic weapons. The TOW added significantly to the blue scheme of maneuver when it entered the game, by applying its added range to create earlier engagements. As figure III-51 shows, the concept of decentralizing antitank weapons to maneuver elements enhanced the capability to create and sustain engagements. This suggests that the optimal blend of weapons systems (placing firepower in optimal echelons of the organization) plus enhanced capability to maneuver will create the survivable infantry battalion needed for the predicted threat.

The varied styles in playing this wargame created several observations by controllers that merit comment. Unfortunately, these statements are unsupported by conclusive data.

1. The first group of players, without supporting arms, created a different temperament for the game than in the second case. The absence of supporting arms created a cautious style of play with a defensive flavor. Noticeably, the engagement of targets seemed to be later in the game's development,

and a preference for engaging the "soft" targets (self-propelled artillery, trucks, etc.) existed.

2. The organic weapons available to the infantry battalion had a minimal effect on the game's outcome. The weapons with the greatest density (LAAW, M203, etc.) saw little utilization in the wargame's play. This was so because the weapons that possessed greater standoff capability proved to be the source of red attrition. For this scenario, the TOW and company mortars added positively to the weapons mix. Value could probably have been realized from an armor penetrating round for small arms, thus increasing their effectiveness.

3. One aspect of the wargame was not applied. The red element possessed an attack helicopter capability. This capability was not introduced by controllers as its use would have virtually "stopped the game." Attrition levels were significant as they were. An air defense capability was given to the second group of players by attaching REDEYE teams. Controllers could anticipate that the result of entering red attack helicopters into the wargame would be the denial or severe restriction of friendly tactical mobility and maneuver. By relating this decreased maneuverability to the wargame's results, one can clearly forecast the dramatic effects on casualty rates and battlefield survivability. The game suggested to the study team that the appropriate counter to retain required tactical mobility is a correspondingly responsive air defense capability.

Summary

The game indicated that organizational design has a definite effect on an infantry battalion's performance. The comparison of light, foot-mobile infantry against mechanized forces demonstrates the significant influence of tactical mobility and maneuver. The following items summarize the results of the infantry battalion study's wargame phase:

- Four rifle company structures had greater movement of maneuver elements.
- Increased mobility produced less attrition.
- Four rifle company structures had less attrition.
- Four rifle company structures had smaller degradation of red to blue firepower ratio than did three company structures.
- Antitank weapons were engaged earlier and more often over time when decentralized to the maneuver elements.

In brief, a four rifle company battalion is more desirable than a three company structure. With an MRB as the adversary, there appears to be a distinct advantage in being able to apply anti-armor assets in a decentralized fashion. This suggests either a value to decentralizing AT weapons, with the many drawbacks attendant to that action, or the assurance of adequate mobility to achieve the rapid task organization of centralized AT assets.

Finally, if the battlefield is expanded to include an air threat, a responsive air defense capability is required to

enhance survivability and retain the capability to maneuver. Overall, the need for a close tie between firepower and mobility was clearly observed.

IIIC. WEAPONS SYSTEMS ANALYSIS

Introduction

Inherent in the task of structure development was an analysis of the weapons systems which generated the firepower aspect of combat power for the infantry battalion. This review was not conducted with the thoroughness and vigor which are needed to recommend specific weapons or types, but rather evaluated the nature of various infantry weapons systems to gain an appreciation of the organizational and manpower requirements which accompany them. In the course of that examination, some observations relating to weapons, not organizational structure, were unavoidably made and are included in this report, as suggestions only.

This task was precipitated in view of the vast array of potential systems that are extant in, or programmed for, the hands of United States, NATO, and other allied services. The list is exhaustive and expanding. Another consideraton was the size unit which this study was chartered to develop. Guidance established the ultimate battalion to be "about 900" USMC personnel. This factor mandated an efficient selection of weapons that would optimize firepower characteristics and also provide a balanced blend. In so doing, such philosophies as "bigger is better" were not always appropriate. In most instances, there existed a tradeoff of some type (e.g., bigger but fewer, smaller but more)

brought on by the fact of personnel constraint. The study team considered differing factors and advice, and attempted to find that tradeoff point best suited to unit size and threat.

The following considerations were used as a framework in analyzing and selecting weapons systems:

- *The infantry battalion mission will remain unchanged.* Provided in initial tasking guidance from CMC at the onset of this study, this consideration was construed to imply that the infantry battalion of the 1980s would essentially remain light and amphibious. Lightness implied a minimum of lift requirements and further implied the ability to man-pack weapons systems under extraordinary conditions on terrain with minimal loss of firepower capacity. It was not considered to preclude the incorporation of vehicular-borne weapons systems provided the weapons themselves could be employed without the platform as necessary.

- *The threat is valid.* As discussed in Section II of this report, the future threat can be reasonably projected as Soviet-influenced. The USMC infantry battalion, then, should contain a blend of weapons systems capable of meeting and defeating this threat. This implies the inclusion of weapons capable of being employed at relatively long standoff to immobilize armor, deny aviation capability, and force the dismounting and dispersal of mounted infantry. Although these requirements are largely dependent upon weapons systems

and employment beyond the capability of the infantry battalion, the battalion must still possess sufficient organic means to ensure survival at first engagement and until such time as the other more appropriate means can be requested, employed, and coordinated. Further, the infantry battalion commander's arsenal should be such that his ability to initiate offensive combat action at a time and place of his own choosing is assured.

- *The infantry battalion will not fight singularly.* Weapons systems for the infantry must be chosen in view of the Marine hallmarks of the inherent superiority of task-organizing and fire support planning (other units will also be fighting the same battle).

- *Task-organization is not a panacea.* This guideline acknowledges the opposite of the above principle. From the perspective of the infantry, supporting firepower normally implies some degree of time-delay. Regardless of the length of that delay, the infantry is in the battle for the duration and must have ample firepower immediately available.

Approach

To determine those weapons systems and types that should be organically incorporated into the USMC infantry battalion, a four-phase approach was selected.

- *Phase #1 - Weapons Systems Types.* This phase of the analysis was non-quantitative for the most part. It incorporated

the expert opinions of senior officers of varying MOS's, and the results of such resources as the Infantry Battalion Advisory Panel, a questionnaire, facets of the Development Center war game effort conducted as a portion of this study, and the use of the computer-analysis (AMORE) of battalion resiliency. Each of these efforts are discussed elsewhere, in detail, in this report.

- *Phase #2 - Weapons Systems Characteristics and Capabilities.* Conducted concurrently with phase #1, this effort injected an objective, analytical perspective into the process. It provided "acid-test" comparisons between competing systems and type systems, and measured varying strengths and weaknesses of the competitors. Characteristics and capabilities which were considered are:

  - System weight
  - Range
  - Lethality
  - Comparative Firepower
  - Transportability (and mobility)
  - Crew (manpower) requirements
  - Maintenance

- *Phase #3 - Weapons System Mix.* A balanced blend of weapons system types was the objective being sought. In the course of the study, it became obvious that construction of an infantry battalion which was firepower heavy was quite simple to attain. However, if such a structure were created

without regard to mix considerations, a military unit with a mission as broad as that of the Marine infantry battalion could lose flexibility. During this phase, previous trends in weapons selection which were oriented towards one specific scenario were re-evaluated. This was done to ensure the infantry battalion could not only engage Soviet-styled forces, but could as effectively conduct military operations in a built-up area (MOBA), could also fight less conventional opponents, and would still be functional in restrictive terrain. These considerations centered on a review of weapons with a view toward favoring those which were:

- Light
- Multi-optional
- Balanced
- Redundant
- Responsive
- Efficient
- Effective

• *Phase #4 - Weapons System/Structure Integration.* The imposition of a 900-man personnel ceiling upon the Marine infantry battalion impacts dramatically upon weapons system and type selection. The effect is most strongly felt in the realms of mix and density. This phase dealt with that effect and suggested structure trends which would best incorporate as many of the desirable weapons system features as could be fitted into a bounded organization.

Weapons Systems Types

For purposes of analysis, weapons types pertaining to infantry units were classified into the following categories:

- *Small arms*
  - direct fire (e.g., rifles, machineguns)
  - indirect fire (e.g., grenade launchers)
- *Assault weapons* (e.g., rocket launchers, flame weapons)
- *Indirect fire weapons* (e.g., mortars)
- *Anti-armor weapons*
- *Air defense weapons*

The Marine battalion commander's organic arsenal currently contains four of the five weapons system types listed above. (There is no organic air defense capability). Figure III-53 summarizes the current weapons by type. As the status of the M202A1 is not anticipated to change, the battalion actually possesses only three of the five systems, unless some weapons are used in their secondary role, such as, the LAAW and/or M203 to fill the void in assault weapons.

- *Small arms*
  - Current. The infantry battalion's small arms inventory (excluding the M1911A1, .45 caliber pistol) has remained relatively stable for the last decade. The Vietnam era introduced the M16A1, 5.56mm rifle as the basic infantry

TYPE	NOMENCLATURE	SYSTEM
SMALL ARMS DIRECT FIRE	M16A1 REM 700 M60	RIFLE RIFLE (SNIPER) MACHINEGUN
INDIRECT FIRE	M203	GRENADE LAUNCHER
ASSAULT	M202A1*	FLAME WEAPON
INDIRECT FIRE	M19 (60MM) M29E1 (81MM)	MORTAR (COMPANY) MORTAR (BATTALION)
ANTI-ARMOR	M72A1 (LAAW) M47 (DRAGON)	ROCKET LAUNCHER MISSILE
AIR DEFENSE	NONE	

*NOT AVAILABLE SINCE 1979 DUE TO TECHNICAL/MAINTENANCE DIFFICULTIES.

Figure III-53 - Organic Weapons by Type

weapon, replacing the M14A1, 7.62mm. The M203, 40mm grenade launcher, coupled the M16 and the single purpose M79 grenade launcher into a hybrid systems, with no loss of resultant capability to either component. The M60, 7.62mm, machinegun provided rifle companies with their heaviest organic automatic weapons capability, during this same period.

Presently, this set of small arms allows effective engagement of an exposed enemy force at ranges up to 1000 meters (maximum effective range of the M60) and more intense engagement within 500 meters. None of these systems provides effective fires against protected enemy forces, other

than possible suppression of those protected by means other than armored carriers. All systems can be utilized effectively in open, closed, fortified or built-up areas, and in extremes of temperature (given proper maintenance attention).

Lastly, the M203, 40mm, grenade launcher allows infantry introduction of chemical agents into the battlefield out to 400 meters.

- Future. Other than product improvements, few changes are presently envisioned for this set of weapons systems over the next decade. The most significant development in this category will be the Squad Automatic Weapon (SAW). Four versions of this system, in both a 5.56mm and 7.62mm configuration, are being considered and tested. Incorporation of this system would enhance small arms standoff distances by projecting range engagement into the 800-1200 meter band, complementing M60 machinegun fires.

Other improvement programs being pursued focus primarily on increasingly lethal ammunition types to be delivered from these same systems. A program for development of a 9mm pistol to replace the M1911A1, .45 caliber pistol, is also underway at the direction of the Office of Secretary of Defense (OSD).

- Conclusions and Observations

(1) A determination as to the current acceptability of small arms systems must be made.

(2) The development of the Squad Automatic Weapon (SAW) will enhance the capabilities of this type category of systems, if maximum effective ranges of 800-1200 meters are attained.

(3) Determine the development of armor-piercing ammunition (5.56 or 7.62mm or high velocity 40mm) capable of penetrating projected USSR BMP armor which would significantly increase small unit lethality on the battlefield.

- *Assault weapons*

  - Current. The infantry battalion's arsenal of assault weapons is, for all practical purposes, non-existent in terms of dedicated assault systems.

The M202A1, Multi-Shot Portable Flame Weapon (MPFW) was introduced into the infantry battalion in the 1960's to improve the infantry flame capability in an assault role. Within the last decade, and moreover, within the last year, severe maintenance difficulties have occurred. As of 11 October 1979, 565 Marine Corps launchers (out of 1262 on hand) had been deadlined for mechanical breakages and external and tube damage. The future of this weapons system is presently unresolved. Indications appear that it will be dropped entirely from the inventory in the early 1980s.

The M72A1 (M72A1E1) Lightweight Anti-Armor Weapon (LAAW) presently provides the assault section of the infantry rifle company with its assault capability. Although its intended

use was as an anti-armor weapon, it has been relegated to the broader role of an assault weapon. This role evolved from the system's use in the Vietnam war and subsequent issuance as a munition. In this regard, it is quite versatile and capable of effective employment in a variety of roles. It is light and easy enough in its operation to allow issuance to virtually all infantrymer within a rifle unit, thereby providing close-combat assault capability.

In a broad sense, the M203, 40mm, grenade launcher may also be viewed as an assault weapon. Although it possesses little, if any, penetrating capability against a wall, its bursting characteristic can inflict damage to some extent by firing through windows and apertures.

The M47 DRAGON could also be employed in an assault mode. Its optical tracking sight would be accurate against stationary targets such as windows and apertures. Its penetration capabilities, though not entirely suited to non-armor rupture, can nonetheless afford some measure of effect. However, its elevation and depression limitations and wire-guided delivery system inhibit its potential, particularly in a MOBA environment.

In summary, the current infantry battalion weapons arsenal does not contain an effective, dedicated system whose primary mission is assault target engagement. To engage such targets presently requires application of a system(s) whose primary capability, and hence, effectiveness,

is against something other (normally anti-armor) than hardened targets.

- Future. Development of an assault weapon is ongoing. Presently, four assault weapon systems are being tested, reviewed, studied or monitored by the Marine Corps. One of these (the VIPER) is properly classified as an anti-armor weapon, but is mentioned here due to its intended role as a follow-on to the LAAW.

The Shoulder-launched Multi-Purpose Assault Weapon (SMAW) program was initiated in 1976 with CMC approval (ROC #134798 of 26 August 1976). This program is presently in advanced development and has three prototypes:

(a) 3 tube launcher, reusable;

(b) 1 tube launcher, reusable; and

(c) 1 tube launcher, throwaway.

Each prototype is designed to defeat hard and soft targets, as well as light armor (BMPs). The SMAW initial operational capability (IOC) is still undetermined, pending completion of advanced testing and decision as to prototype desired, but it is intended to be in the 1982-1986 timeframe.

The Special Hard Target Assault Weapon, Lightweight (SHAWL) and Riflemen's Assault Weapon (RAW) are both U.S. Army programs being monitored by the Marine Corps developmental community as a result of Letters of Agreement. Both systems are still in exploratory development. Each system

is intended to provide capability to attack hard and soft targets and lightly armored vehicles, as well.

- Conclusions and Observations

(1) A current family of assault weapons systems is practically non-existent.

(2) Current assault weapons systems employment must rely on systems designed for purposes other than defeating bunkers and fortifications.

(3) Considering the feasibility of operations in a built-up area, a need exists for a system designed to defeat hard and soft bunkers, walls, and fortifications.

• *Indirect fire weapons*

- Current. The inventory of indirect fire weapons includes the M29E1, 81mm mortar (battalion level) and the M19, 60mm mortar (company level). Both systems have existed for some time and possess demonstrated capabilities. These type systems are considered essential for the infantry battalion in that they provide the only organic engagement capability beyond a range of 1100 meters. However, due to the manpower characteristics of a footmobile battalion of about 900 Marines, legitimate concerns as to the role importance and firepower contribution of these systems have arisen. These concerns include:

(1) The crew-served weapons manpower cost.

(2) Ammunition distribution difficulties.

(3) System level mix.

(4) Individual crew-load carrying weights.

(5) Limited effective target array vis-a-vis the anticipated threat.

The M30, 4.2 mortar, has also been reviewed. Currently maintained in repository at MCLB, Barstow, California, its crew-size (7 men per tube) and system weight (671 pounds) appear inappropriate for incorporation into a small foot-mobile unit.

- Future. Possibly the most significant development is the adoption of the XM224, 60mm Light Weight Company Mortar System (LWCMS). Due for incorporation into the battalion in the early eighties, this system provides a significant improvement in both range and lethality characteristics over the current 60mm mortar with slightly less than one pound added system weight. The increased range, however, suggests the possible need for additional forward observer and fire direction control assets. The XM224, LWCMS, uses a multi-purpose fuze and presently has only a High Explosive (HE) and training round. The illumination, smoke, and white phosporous (WP) ammunition used in the old M19 60mm mortar can be fired from the XM224. Improved ammunition in each of these types is being developed to attain greater ranges.

Other indirect fire weapons system programs are still conceptual, including improvements to the 81mm mortar system.

- Conclusions and Observations

(1) The XM224, 60mm mortar, LWCMS, will enhance the infantry battalion's indirect fire capability.

(2) The current mix of 81s and 60mm mortars may no longer be the most effective or efficient possible, due to improvements in the XM224, 60mm mortar.

(3) Ammunition development to include illumination, smoke, and white phosphorous in ongoing.

(4) Indirect fire systems could be effectively enhanced with development of a chemical agent round.

- *Anti-armor weapons*

  - Current. The infantry battalion of today may draw upon two organic systems to engage armored targets. These consist of the M47 (DRAGON) and the M72A1E1 (LAAW). In order to effectively employ these, he must close to within 1,000 meters, the maximum effective range of the DRAGON, and maintain this closure distance. The likelihood of his being able to maintain this proximity with a mobile enemy force in any form of open terrain is slight. Beyond this range, he can only engage an armored enemy with mortar fire, neither designed for, nor effective against, an armored force. The M72A1E1 (LAAW) can also be fired to ranges of 1,000 meters. However, its actual maximum effective range is only 200 meters (based on an average for both moving and stationary targets).

As the primary organic anti-armor weapon for the battalion commander, the DRAGON has enhanced his capability beyond earlier levels. However, it suffers from severe limitations other than just range, considering its increasingly significant share of the future battle. Most limiting is its optical, wire-guided tracking system. A fire-and-forget capability would provide greater probability of crew survivability and possibly a higher probability of kill.

Other systems that can be classified in this category and are current but not within the Marine infantry battalion, include the M40A2 106mm Recoilless Rifle, the M220A1 (TOW) and the M67, 90mm Recoilless Rifle.

The 106mm RR was phased out of the infantry battalion in the late 1970s and replaced by the DRAGON. A major reason for this change was the discontinuation in production of 106mm ammunition by U.S. sources. Notwithstanding this fact, the comparative characteristics and capabilities of the 106mm RR versus the M47 DRAGON alone indicate this to have been a proper transition.

The M220A1 (TOW) represents a more effective anti-armor system than the M47 DRAGON in terms of range. Currently resident in the Anti-Tank Company of the Tank Battalion, it is a mounted system (M151A1), but is also designed for foot mobile employment.

The M67, 90mm Recoilless Rifle is an antitank weapons system currently used by at least the U.S. Army's "Berlin

Brigade". It is a lightweight system that is man-packable, requiring a 2- or 3-man crew. Incorporation into the infantry battalion would represent some increase above the LAAW's capability, but does not compare faborably with M47 DRAGON potential.

- Future. No new systems designs are presently being funded beyond product improvement for the DRAGON and TOW. These programs are attempting to increase range capability, penetration/lethality capability, and tracking/homing (fire-and-forget) capability.

- Conclusions and Observations

(1) Anti-armor weapons density requires improvement in view of the future threat.

(2) Present organic anti-armor weapons do not provide sufficient standoff range to effectively engage enemy armored units.

- *Air defense weapons*

- Current. The infantry battalion possesses no organic air defense weapon system. Point air defense for the battalion is normally accomplished by task organization of Redeye Teams from the Forward Area Air Defense (FAAD) Battery of the Marine Air Control Group (MACG).

- Future. Enhanced Soviet armed assault helicopter capabilities and their intended doctrinal employment of these aircraft has prompted a review of the requirement for air defense weapons systems needed for infantry support.

The addition of organic air defense assets appears reasonable in view of the threat. The attendant command and control, and training and maintenance problems, suggest a trudent examination of this requirement.

- Conclusions and Observations

(1) The absence of organic, dedicated air defense systems is a distinct weakness in the infantry battalion's firepower balance.

(2) This topic should be reviewed diligently, as the Soviet armed helicopter capacity increases.

- *Summary*

The infantry battalion weapons systems arsenal requires considerable upgrading. Virtually all system types (small arms, anti-armor, etc.) are deficient in their present state when compared against the threat. Major and rapid action is required in all areas, although the need for an assault weapon is considered paramount.

Capabilities and Characteristics

This task identified characteristics of weapons and compared them to one another to determine strengths and weaknesses between systems. The results of this analysis, coupled with subjective input gathered from military experience and judgment, furnished the base for development of a sound mix of system types. In most instances, the primary considerations were each weapon's effectiveness and contribution within the threat environment, or the

need for each weapon based upon the threat. Attention was given to current weapons, but previously organic infantry battalion weapons still extant within the Marine Corps inventory were also considered, as were some systems not previously available, but reasonably attainable.

The WEI/WUV (Weapons Effectiveness Index/Weighted Unit Value) methodology has been used on a limited basis as one form of comparative analysis; but when other measures of effectiveness, such as, lethality, range, etc., have produced significant results, they were also applied.

- *Measures of effectiveness (MOE).* The list of potential MOEs for weapons evaluations is exhaustive and can range from pertinent to not applicable within the context of this study. For example, "range" would normally always be considered as pertinent; "pounds of trigger pull", within the context of this study, would not be deemed as a crucial determinant. In this regard, this study has attempted to limit the MOEs of each system type to those of greatest concern to the infantryman. Figure III-54 displays the MOEs primarily considered by this analysis.

It is apparent that range, weight, and crew-size are common to all weapons system types. In all instances, these were the initial measures studied. Other MOEs were selected and applied when these initial ones did not sufficiently distinguish capabilities and characteristics.

WEAPONS SYSTEM TYPE	MEASURE(S) OF EFFECTIVENESS (MOE)
SMALL ARMS	RANGE, WEIGHT, CREW-SIZE
ASSAULT WEAPONS	RANGE, WEIGHT, CREW-SIZE, PENETRATION
INDIRECT FIRE	RANGE, WEIGHT, CREW-SIZE, LETHALITY, SHELL/FUZE MIX, DENSITY
ANTI-ARMOR	RANGE, WEIGHT, CREW-SIZE, PENETRATION, TRACKING, DENSITY
AIR DEFENSE	RANGE, WEIGHT, CREW-SIZE, TRACKING/HOMING, C^2

Figure III-54 - Weapons System Type
Measures of Effectiveness

Considering only those weapons systems presently organic to the infantry batttalion, initial analysis is summarized by figures III-55 and III-56.

Figure III-55 indicates maximum effective ranges of each of the battalion's organic weapons systems. It can be seen that the battalion commander must close to within 1,100 meters before he can effectively engage the enemy with organic, direct fire weapons. Beyond that range, he must use organic, indirect fires or rely upon non-organic support (attached, artillery, or CAS).

This range limitation is not debilitating in closed terrain (jungle, mountain, etc.) or in a MOBA environment.

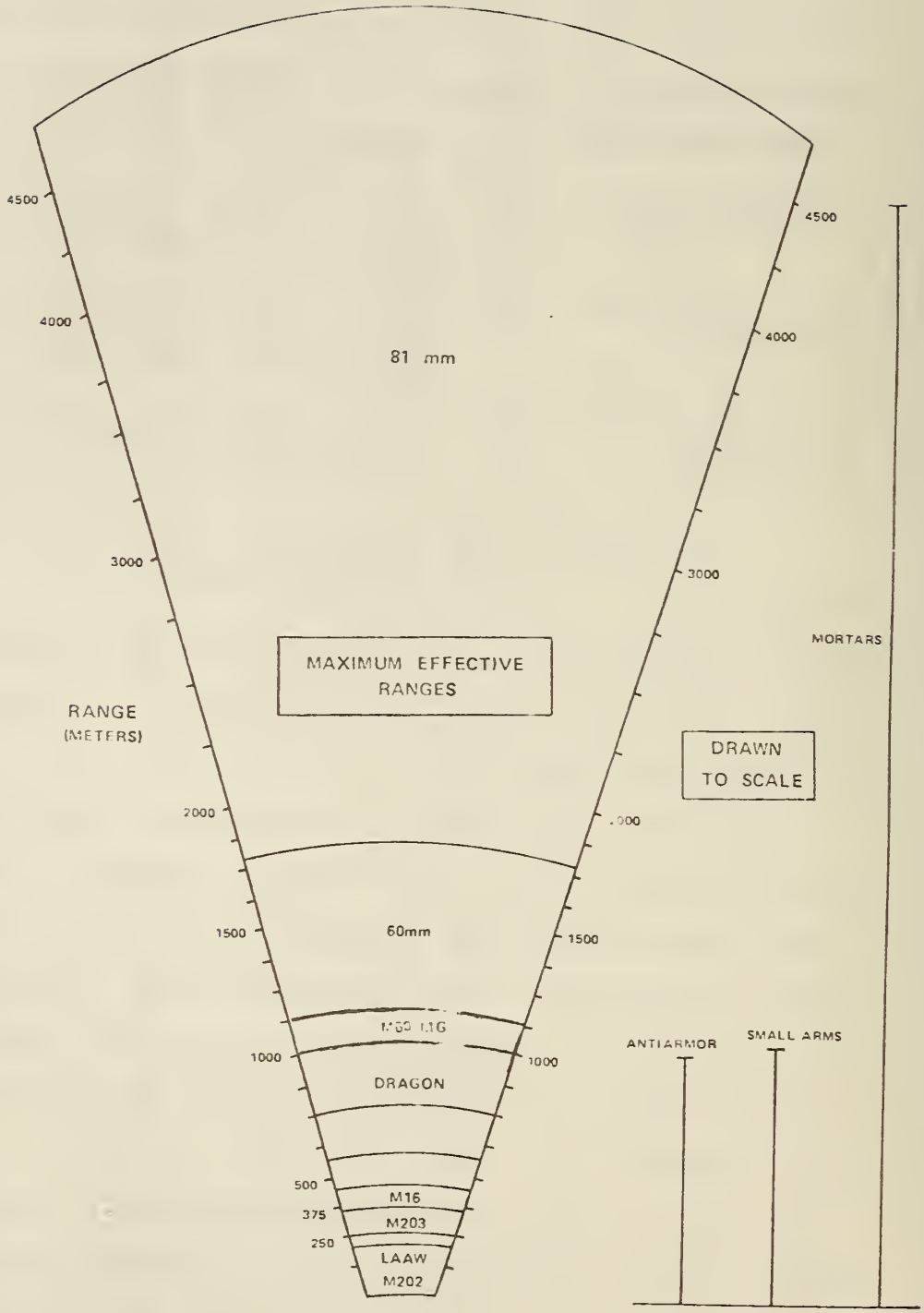


Figure III-55 - 1980 Infantry Battalion Organic Fire Projection Array

However, it is a vulnerability in open terrain which supports cross-country vehicular traffic. Under these latter conditions, the infantry battalion commander can expect to fight and win or lose his battle in a time span of 4-6 minutes, as will be discussed later in this text.

Figure III-56 depicts current organic weapons systems in terms of total system weight (not including normal ammunition loads) and crew-size (per tube, launcher, or gun). As would be expected, weapons weights tend to increase with greater range capability, and hence, the crew-size also increases. System weight and crew-size can generally be considered a function of system range:

$$\left[\text{Crew Size} = f\ (\text{Weight})\right] = f\ (\text{Range})$$

This functional relationship has held true until most recently. Weapons technology is now at the stage where increased ranges are possible with no resultant increase in weight or crew-size. The XM224, 60mm Light Weight Company Mortar System (LWCMS) illustrates this reversal. This trend reversal is significant. Manpower realities consistently dispel the notion of providing large crews to service and transport heavier weapons systems. This consideration was weighed heavily in weapons system selection for future battalions - *those systems which maximized range, minimized weight, and required fewest personnel were viewed most favorably.*

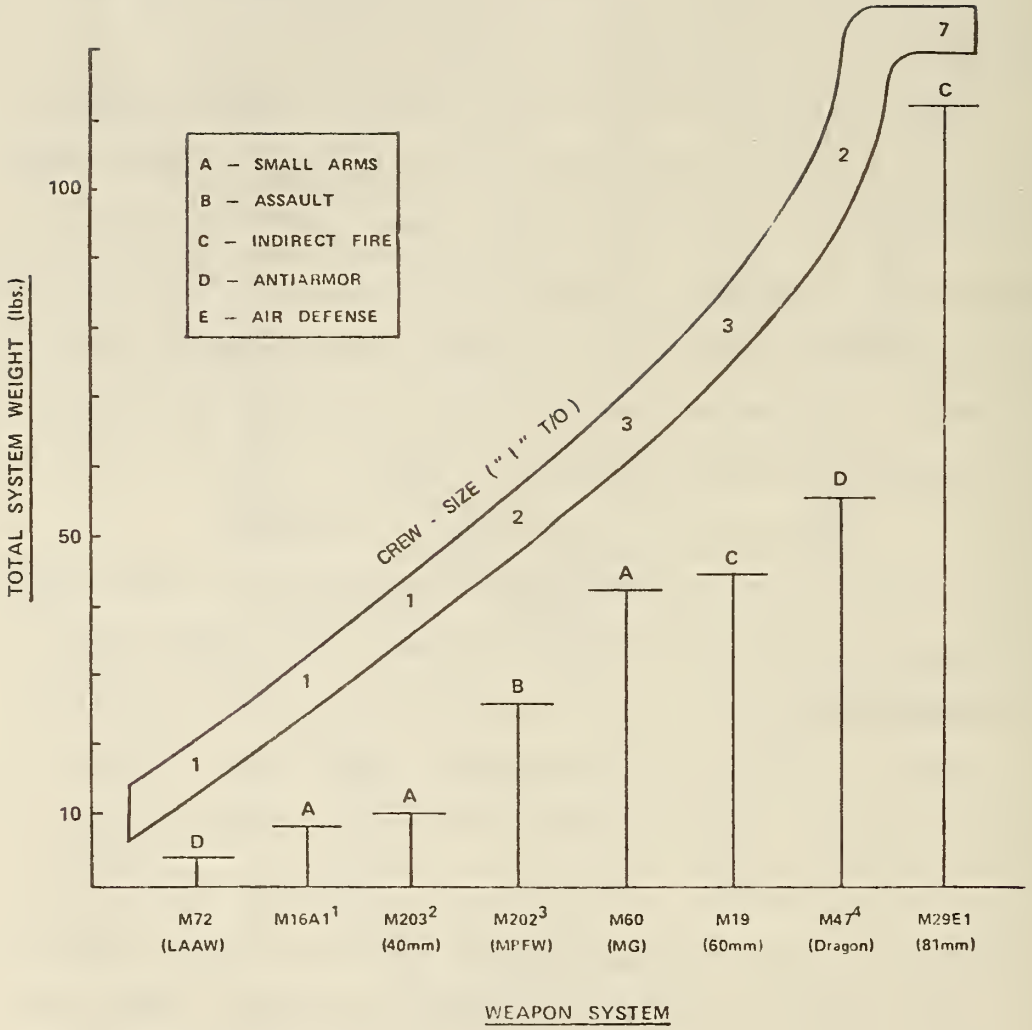


Figure III-56 - 1980 Infantry Battalion Organic Weapons System and Crew-Size

• *Analysis of small arms.* Examination and comparative analysis of this category of weapons system type resulted in four considerations of importance:

- M203 criticality.
- M2, .50 caliber machinegun feasibility.
- Mark 19, Mod 1, (XM174E1) 40mm automatic grenade launcher feasibility.
- M16A1 combat vulnerabilities.

Figure III-57 summarizes the characteristics of these, and other small arms systems.

•• *M203, 40mm, Grenade Launcher.* A multipurpose system which combines the characteristics of the M16A1 and M79, 40mm, Grenade Launcher. Examination of this system during the combat attrition/resiliency analysis computer simulation revealed it to be a critical component of the rifle squad firepower capacity which is based on two factors:

(1) It is a multipurpose system with broad employment possibilities (illumination, HE, AP, smoke, gas; MOBA, jungle, mountain and desert), and,

(2) It is the only organic infantry battalion weapon capable of projecting chemical agents at a distance.

For these reasons, the M203 is considered necessary in future battalion organizations in greater densities.

•• *M2, .50 Cal Machinegun* - Consideration of the M2, .50 caliber machinegun was primarily based on input from the Advisory Panel. In addition to the basic considerations, sustained rate

NOMENCLATURE	CALIBER	MAX EFF RANGE (M)	TOTAL SYSTEM WEIGHT (LBS)	CREW SIZE	SUSTAINED RATE OF FIRE
M16A	5.56MM	460	7.91[1]	1	12-15/MIN
M14A1	7.62	460	10.10[2]	1	15/MIN
M203, GL	40MM (5.56MM)	150/350	11.0[3]	1	
M60 MG	7.62MM	1100	42.5[4]	3[7]	100/MIN
M2 MG	.50 CAL	1830	128.0[5]	4[8]	40/MIN
MARK 19, MOD 1(XM174E1)	40MM	1600	97.0[6]	4[9]	490/MIN

NOTES:
[1] WITH MAGAZINE AND 30 ROUNDS
[2] WITH FULL MAGAZINE
[3] M16A1 AND M203 (LOADED)
[4] GUN, TRIPOD, T&E (UNLOADED)
[5] GUN, TRIPOD, T&E (UNLOADED)
[6] GUN, M3 TRIPOD (UNLOADED)
[7] "I" SERIES T/O
[8] FM 23-65
[9] SUGGESTED BY NAVAL ORDNANCE STATION, LOUISVILLE, KY

Figure III-57 - Small Arms Data

of fire in rounds per minute was also considered. In order to provide perspective, the weapon was compared with the M60, 7.62mm, machinegun.

The results of the comparison clearly favored the M2 as far as range and armor-piercing power were concerned. Balancing these strengths, however, were some negative aspects; namely, the .50 caliber machinegun.

(a) Weighs 3 times more than the M60 system (128.0 lbs vs. 42.5 lbs);

(b) Requires a crew of four personnel (minimum - FM 23-65) vs. three (minimum) for the M60;

(c) Fires at a sustained rate of 40 percent that of an M60 (40 rds/min vs. 100 rds/min).

Currently, development of 7.62mm and .50 caliber Saboted Light Armor Penetrator (SLAP) ammunition is being pursued. The program is presently in the exploratory development phase with no firm completion date. Success of this program would provide the M60 machinegun with an armor-piercing capability, thus further closing the gap.

On balance, the M2, .50 caliber machinegun, could provide additional capability to the infantry battalion, particularly extending direct fire engagement ranges and providing an anti-armor capability to complement DRAGON/TOW systems. However, system weight is a significant negative factor. The M2, .50 caliber machinegun could be made more attractive through vehicular mounting and/or institution of an unmanned arsenal concept.

An additional alternative is greater support of the SLAP round project for M60 machineguns. This would provide a considerably lighter system than the M2, recuiring fewer personnel and still possess a multi-mission (AP and AT) capability. This, too, would provide additional capability to the infantry battalion, but with much less structural turmoil and manpower demands.

●● *Mark 19, Mod 1 (SM174E1) 40mm, Automatic Grenade Launcher (Machinegun).* This weapons system is in current production and has been procured by the U.S. Navy, Coast Guard, and Army. Primarily intended to be mounted upon riverine vessels and armored personnel carriers, it can also be configured in a non-vehicular platform, tripod arrangement, for possible use by ground forces. In this regard, it was considered by this study as a potential infantry battalion weapon.

Of a positive nature, the most contributory characteristics of this system are:

RANGE (max eff) = 1600 meters

RATE OF FIRE (sustained) = 490/minute

and

AMMUNITION - M430 HEPD

The M430, HEPD round is capable of penetrating Soviet BMP armor.

Of equal import, but of an opposite nature, is the total system weight (153 lbs (unloaded) with an M3 tripod) and the

weight of ammunition (37.5 lbs per 50 round cannister). As was the case with the M2, .50 caliber machinegun, this system has certain superior characteristics and capabilities. However, total system weight is a negative feature for a footmobile, light infantry force.

System assets could be effectively capitalized by vehicular mounting. Adoption of an "unmanned arsenal" concept by mounting systems on infantry battalion vehicles could provide a blending of best solutions (i.e., system presence, and negligible manpower requirements).

•• *M16A1 Combat vulnerabilities.* The M16A1 can be operated in a spectrum of environments (MOBA, jungle, desert, etc.) but has three inherent detractors which limit its utility as a combat weapon:

(1) Excessively complicated sight mechanisms;

(2) Plastic/fiberglass stock and handguards and;

(3) Excessive muzzle velocity for close combat.

The sight mechanism is excessively complicated, requiring cumbersome manipulation of both the front and rear sights to achieve proper "doping' of "battle sights." Under pressing combat conditions, wherein inoperable weapons are freely substituted with weapons from ineffective casualties, this seemingly slight design characteristic can be awesomely critical to the infantryman. The front sight alone requires a tool (other than might be expected for the infantryman to possess) to change its setting.

The handguard and stock construction of the M16A1 is neither combat hardened nor combat silenced. Handguard breakage is a continuing problem in field training exercises, let along protracted combat environs. The stock suffers breakage under rigorous conditions, rendering the system inoperable since the buffer/spring group is housed within. The plastic fiberglass construction, additionally, lends itself to noise discipline problems. Scraping against vines, rocks, etc., creates an unmistakable noise signature for nearby enemy personnel to detect. This is undesirable, particularly in patrolling activities which constitute a large portion of the infantryman's role.

Lastly, the muzzle velocity of the 5.56mm ammunition provides through and through penetration of enemy personnel in environs and moments of close combat (MOBA, jungle, FPF). However, it does not always provide the knockdown power to stop his advance immediately. From the infantryman's vantagepoint, this is undesirable.

These combat vulnerabilities of the basic infantryman's weapon should be rectified. Adjustable sights similar to those of the M14A1 (including a fixed front sight), which were manipulable by hand (via knobs) and required no tools, would alleviate a prime system difficulty. Noise dampened and hardened stocks and handguards would minimize breakage and combat detection. Paring down muzzle velocity or providing a larger caliber found would potentially achieve greater and more assured knockdown power.

●● *Developmental programs.* The two programs currently in funding that will most likely affect the small arms category are the Saboted Light Armor Penetrator (SLAP) Ammunition, and the Squad Automatic Weapon (SAW).

The SLAP round program was discussed in the preceding paragraphs. Successful development of such ammunition will significantly enhance the firepower potential of any unit which uses it.

The Squad Automatic Weapon (SAW) is currently in exploratory development. Four candidate systems are being tested in both a 5.56mm and 7.62mm configuration. The ultimate goal is a one-man weapon system with an effective range of 800-1200 meters. This complements the range of the M60, 7.62mm, machinegun; however, it would be organic to the Marine rifle squad vice the weapons platoon.

Development of both a 7.62mm SLAP round and a 7.62mm SAW would enhance the power of both the rifle unit and the weapons platoon.

●● *Summary*

(1) Given that the infantry battalion will fight with greatest intensity within 1,100 meters of its units, the need for small arms is established.

(2) In view of its significant role, the M16A1 possesses inherent design deficiencies versus the rigors of a continuous combat environment.

(3) The M203, 40mm, Grenade Launcher, provides

the only organic infantry battalion capability to project chemical agents at a distance.

(4) The M60, 7.62mm machinegun is an adequate weapons system whose capabilities could be enhanced with development of Saboted Light Armor Penetrator, 7.62mm, ammunition.

(5) The M2, .50 caliber, machinegun, can provide enhanced firepower capability to the infantry battalion, but is prohibitively heavy except as a mounted system.

(6) The Mark 19, Mod 1 (XM174E1), 40mm High Velocity Automatic Grenade Launcher can provide enhanced firepower capability to the infantry battalion, but is prohibitively heavy except as a mounted system.

(7) The potential penetration capability of the Saboted Light Armor Penetrator ammunition could be exploited effectively in a 7.62mm configuration.

(8) The Squad Automatic Weapon (SAW) potential for range enhancement/engagement into the 800-1,200 meter band would significantly boost rifle squad lethality.

•• *Conclusions*

(1) A need for small arms is established.

(2) The current family of small arms is marginally acceptable.

(3) The M16A1 should be redesigned with elementary combat needs of the infantryman as paramount parameters.

(4) The M203, 40mm Grenade Launcher is a critical small arms system that requires greater density.

(5) The M60, 7.62mm machinegun is an adequate system that should be retained.

(6) The M2, .50 caliber machinegun could be incorporated into the infantry battalion as a vehicular-mounted addition.

(7) The Mark 19, Mod 1 (XM174E1), 40mm, High Velocity, Automatic Grenade Launcher, could be incorporated into the infantry battalion only as an addition to the "unmanned arsenal".

- *Analysis of Assault Weapons.* The current USMC infantry battalion arsenal does not contain a dedicated and specially designed assault weapons system. Training for the employment of other systems not designed (and, therefore, less effective) for assault functions has recently been necessary.

The M202A1, Multishot Portable Flame Weapon (MPFW) has been removed from the infantry arsenal due to technical difficulties. The M202A1 was a form of assault weapon, providing flame and burst effects, but it lacked the penetration and "behind the wall lethality" effects characteristic of an assault weapon.

Other systems have been utilized as assault weapons with some success, to include combat use in Vietnam. In part, these systems are still considered as assault systems,

although they are not designed for the role. The design of the ammunition warhead for a target other than the typical assault weapon target results in reduced performance by those systems. Three examples are:

- *The 66mm, M72A1E1 Light Anti-Armor Weapon (LAAW)* is an anti-armor weapon. It fires a fixed ammunition rocket with a High Explosive Anti-Tank (HEAT) warhead. This ammunition is designed as a shaped charge to be most effective against armor. The effect against non-armored targets can be significant, but not optimal.

- *The M40A2, 106mm Recoilless Rifle* is an anti-armor and anti-personnel weapon. It fires a High Explosive Anti-Tank (HEAT) round, a High Explosive Plastic with Tracer (HEP-T) round (anti-armor) and an Anti-Personnel with Tracer (APERS-T) round. The effect against other non-armored targets is also not necessarily optimal.

- *The M67, 90mm Recoilless Rifle* used by the U.S. Army "Berlin Brigade" is also an anti-armor weapon. It fires only a HEAT and a practice training round.

These systems, though usable against hardened or soft bunkers and fortifications still provide something less than optimal "behind the wall" effects, when so employed. Given further that the only one of these three systems that the infantry battalion presently possesses is the

LAAW, the net potentiality for breaching built-up and field fortifications is severely limited.

The need for assault weapons is established by history as well as the threat. The USMC Urban Operations Study (see section II-46) clearly delineates the high degree of probability of such engagements in the future. The "threat assessment" section of this study discusses the correlation between amphibious operations and population center densities/locales. These factors, together, add urgency to our need for a specially designed assault weapon.

The primary purpose of an assault weapon is the engagement of non-armor, hardened and soft fortifications. This includes concrete structures (buildings, walls, etc.) and earthen/wooden structures and bunkers. The weapon should possess adequate but not extreme stand-off range. It should be sufficiently lightweight as to allow thick density distribution within rifle units, thereby obviating the requirement for dedicated assault squad personnel.

A system of this description approximates that of the M72A1E1 LAAW. However, the crucial difference between the LAAW and an assault weapon is the warhead; one must be expressly designed to produce optimal effect against non-armored targets.

- *Future*. Both USMC-sponsored (SMAW) and U.S. Army (SHAWL and RAW) programs to fill the void of assault weapons are ongoing. Figure III-58 provides basic data.

SYSTEM	LAUNCHER	MAX EFF RANGE (METERS)	SYSTEM WEIGHT LOADED	CREW SIZE
SMAW (SHOULDER-LAUNCHED MULTI-PURPOSE ASSAULT WEAPON)	3-TUBE (REUSABLE)	250	30-33 LBS	2-3
	1-TUBE (REUSABLE)	250 425[1]	12-18 LBS	1-2
	1-TUBE (THROWAWAY)	250	9-5 LBS	1
SHAWL (SPECIAL HARD-TARGET ASSAULT WEAPON-LIGHTWEIGHT	1-TUBE (THROWAWAY)	200-250	9 LBS	1
RAW (RIFLEMAN'S ASSAULT WEAPON)	M16A1	200	6.5 LBS	1
NOTES: [1]425 METERS WITH A HEAT WARHEAD				

Figure III-58 - Future Assault Weapons Data

(1) SMAW. The Shoulder-launched Multi-purpose Assault Weapon (SMAW) is that system presently being sponsored by the Marine Corps. Both the SHAWL and RAW are being pursued by the U.S. Army, with the Marine Corps monitoring their development.

All of the three SMAW versions currently being tested, have similar range capability (250 meters). The one-tube

reusable version can shoot either a SMAW warhead (against non-armored targets) or a HEAT warhead. The HEAT warhead has a range of 425 meters.

System weights (loaded) appear to be related to launcher complexity. That is, the three-tube (reusable) version, that uses a spotting round and a range finder, is the most operably complex of the three alternatives and weighs significantly more. The one-tube (reusable) model, with interchangeable ammunition, weighs approximately half that of the three-tube model. The one-tube throwaway version is the lightest of systems, weighing approximately 9.5 pounds. To gain perspective, this is about twice the weight of the M72A1E1 (LAAW). As with most weapons, the crew-sizes of the SMAW increase with increases in system weight.

All three SMAW configurations will undergo field and live fire testing by the Human Engineering Laboratory at Aberdeen Proving Grounds, in conjunction with NATO cold weather operations, for a period of approximately six weeks, during 1980. Test personnel will be Marine infantry units. Operational effectiveness data, habitability and ruggedness information, and probability of hit data will be gathered during this time.

Although testing has not yet been performed, consideration of the various factors examined in this study would favor a one-tube, lightweight, less complex assault system. This is largely based on the assumption of lesser personnel requirements.

The one-tube version, reusable, offers a dual capacity system which could be considered efficient; however, it would require a dedicated assault person to maintain the launcher tube. This consideration somewhat obviates its issuance as a munition to riflemen, who would then be required to operably maintain two diverse weapons systems (M16A1/M203 and SMAW). Additionally, it would provide an anti-armor capability that presently exists (admittedly with lesser range effectiveness) in the form of the M72A1E1 LAAW.

From the standpoint of force structuring, the one-tube, non-reusable, throwaway SMAW initially offers the most reasonable approach to resolution of the assault weapon gap. Its range is comparable to all other versions; it is the lightest of the three alternatives; it requires no continuing maintenance; and it can be issued as a munition to riflemen, thereby increasing distribution density on an "as required" basis to fit the direct threat. This version would allow infantry units to arm with either the SMAW or LAAW (or both) as the enemy threat mandated. The systems, though complementary, are exclusive.

(2) SHAWL. This system is presently in exploratory development by the U.S. Army. The SHAWL is approximately one year behind the USMC SMAW program.

This system is competitive with the one-tube, throwaway version SMAW in all initial categories. To date, it has

demonstrated a slightly better "behind the wall" lethality effect (actual data is classified) than the SMAW against walls. It has a slightly lesser effect than the SMAW against bunkers. It is presently being packaged as a throwaway system.

(3) RAW. The Rifleman's Assault Weapon is also a U.S. Army exploratory development program. It is slightly more than one year in trace of USMC SMAW development.

Similar to the old version M14A1 rifle grenade launcher (using a crimped cartridge), it is designed for use with the M16A1, 5.56mm, rifle. The RAW attaches to the barrel-end of the M16A1 and fires as did the M14 version. The system weight of 6.5 lbs is a positive factor, as is the range, crew-size, and non-existent backblast property (unique among these three systems). Three prototypes of the RAW have been constructed.

Developmental difficulties have been encountered in flight stability of the RAW projectile when fired above or below the horizontal plane (into upper building windows, etc.). Its penetrating capabilities thusfar are similar to the SHAWL, and slightly less than the SMAW. Due to its launcher platform (the M16A1) it is packaged as a munition.

It appears that any of the versions of the SMAW, SHAWL or RAW will fill the infantry battalion assault weapons

system void. In view of the sponsorship and advanced status of development of the SMAW, plus our desire to seek systems of lightweight and fewest personnel, development of SMAW should be continued. Monitoring of the SHAWL and RAW programs should also be continued in the event either of these would result in a significantly superior assault weapon at which time they could replace or augment SMAW.

- *Summary*

(1) The Marine infantry battalion does not presently possess an organic assault weapons system expressly designed for the purpose of breaching fortifications.

(2) A need exists for such a weapon.

(3) Current assault capability is vested in the M72A1E1 LAAW, whose warhead is designed to penetrate armor.

(4) The Marine Corps is currently sponsoring an assault weapon development program (SMAW).

(5) The U.S. Army is sponsoring two assault weapons development programs (SHAWL and RAW).

(6) The SMAW program is presently one year more advanced than the other two programs.

(7) Initial MOE data indicates similar performance characteristics and capabilities of all three systems.

- *Conclusions*

(1) There is a need for an assault weapons system organic to the infantry battalion.

(2) Development of the Shoulder-launched, Multi-Purpose Assault Weapon (SMAW) could fill the assault weapon void in the infantry battalion.

(3) The ultimate system should be designed with a warhead configured to engage non-armored targets.

(4) A one-man tube, lightweight, non-reusable (throwaway) version of the SMAW, issued as a munition, would best complement future infantry battalion structure and likely employment.

- *Analysis of indirect fire weapons.* The infantry battalion possesses an indirect fire capability in two forms: a company mortar (M19, 60mm) and a battalion mortar (M29E1, 81mm). Replacement of the M19 is scheduled to begin as early as 1st Quarter, FY-81 (4th Quarter CY-80), in the form of the XM224, 60mm, Light Weight Company Mortar System (LWCMS). Additionally, the M30, 4.2" mortar system components are still maintained, but not operationally manned. Figure III-59 provides characteristics.

An indirect fire system is needed due to the battalion's requirement to initiate fires at maximum attainable distances in order to disrupt enemy advance and attack intentions and to exploit targets of opportunity. This

Nomenclature	Caliber	System Weight	Max. Eff. Range	Crew Size (per tube)	Sustained Rate of Fire
M19	60mm	45.2 lbs.	790m (HE)	3	18
M29E1	81mm	112.5 lbs.	4737m (HE)	7	8
XM224 (LWCMS)	60mm	46.25 lbs.	3500m (HE)	3	20
M30	4.2	672.25 lbs.	5650m (HE)	7	3

Figure III-59 - Indirect Fire Weapons Data

requirement will exist regardless of the battle area in which the Marine Corps might be engaged. Ability to engage targets at high elevations (e.g., in mountainous terrain) and the ability to deliver close, suppressive, overhead fires upon an assault objective, increase the need for this type system.

- *Current.* The M19, 60mm, and M29E1, 81mm, mortars currently provide the infantry battalion indirect fire capability. Crew-size is proportionate to range and system weight, but the LWCMS is a favorable reversal of this trend.

Due to systems and ammunition weights, and the resultant drain upon limited manpower resources, the discussions of these systems during the study effort has forced consideration of trade-offs. Trade-off potential is discussed in the following paragraphs.

(1) M19, 60mm. Discussion of this system is essentially unnecessary, as it has been programmed for replacement in FY-81. It is included only as a comparison.

(2) M29E1, 81mm. This system provides the battalion commander with the greatest range capability of all his organic weapons. It is, however, the heaviest organic weapon and currently requires the largest crew. Retention of this range capability is desirable, but the weight and crew size, when incorporated into an austerely manned unit, indicate the need for additional measures of effectiveness. The next most critical MOEs are: shell/fuze array, sustained rate of fire, and lethality.

(a) Shell/Fuze Array. Figure III-60 displays the types of mortar shells and fuzes available to each of the infantry mortar systems.

	M29E1, 81mm	M19, 60mm	XM224, 60mm
SHELL			
High Exp (HE)	M374A2	M49A2	Yes
White Phos (WP)	M375A2	M302	M302
Illumination	M301A3	M83A1	M83A1
Training/Practice	M43A1	M50A2	Yes
Chemical	None	None	None
FUZE			
Point Detonating(PDF)	M534A5	M525A1	Multipurpose
Proximity (VT)	M532	None	Yes
Mech'l Time	M84	M65A1	Yes (near surface burst)
Delay	-	-	Yes

Figure III-60 - Infantry Mortar Shell/Fuze Array

The M29E1, 81mm mortar possesses the entire spectrum of shell/fuze options, save only a chemical round. The currently organic M19, 60mm mortar possesses the same shell types as the 81mm but lacks proximity and delay fuzes. The XM224, 60mm, LWCMS presently has its own designed HE and training/practice rounds, but must utilize the M19, 60mm WP and illumination shells. Project engineers are capable of developing enhanced versions of both these shells. The LWCMS fuze is multipurpose. It provides a point detonating (impact), proximity, mechanical time (near surface burst-NSB) and a time delay capability.

As would be expected, the range characteristics of each type shell are greater in the larger 81mm version than the 60mm type. However, each 81mm round weighs approximately twice that of its 60mm counterpart.

On balance, a shell/fuze array comparison does not clearly delineate any system as possessing singularly unique properties. The greater ranges of 81mm ammunition are attained at the expense of greater weights. The bursting characteristics of the various caliber shells could be considered also. However, the results are intuitive (larger rounds means larger burst), this measure of effectiveness has more bearing on mix considerations and is discussed in that section.

(b) Sustained rate of fire. Rate of fire is a significant factor, in that effective engagement

implies projection of a sufficient density of explosives to achieve successful disruption. The system sustained rate of fire (of HE ammunition) was selected as the critical measure. Sustained rates of fire are summarized in figure III-61.

System	Sustained Rate of Fire (1 Tube)
M29E1, 81mm (FM 23-90)	8
M19, 60mm (FM 23-85)	18
XM224, 60mm (Test Data)	20

Figure III-61 - Infantry Mortar Sustained Rate(s) of Fire

This MOE is significant due to the larger rates for either 60mm version. Stated a bit differently, using any number of XM224, 60mm mortar tubes and an equal number of 81mm mortar tubes, the commander can project 2½ times the number of 60mm shells as he can 81mm shells, in the same period of time.

(c) Lethality. Unclassified data as to mortar lethality is available. Using the M29E1, 81mm mortar as the baseline (=1.00), a "lethality index" for each system is computed to be as shown in figure III-62.

System	Lethality Index
M29E1, 81mm	1.00
M19, 60mm	.52
XM224, 60mm	.77

Figure III-62 - Infantry Mortars Lethality Index

Simply, test data indicates the 81mm mortar to be approximately twice as lethal as the M19, 60mm mortar with each system being considered as one tube firing one round of high explosive ammunition. This tends to support the intuitive logic that larger ammunition produces greater effects, and favors the 81mm configuration.

The lethality index is a basically acceptable MOE. However, it can be better applied using a more crucial combat MOE: time. That is, how lethal are these various systems, tube for tube, firing at their sustained rate *over the same period of time?*

The lethality index determines the relative effect of firing one round from one tube. Using that same tube, and firing more than one round would produce a cumulative lethality. For example, the 81mm mortar (index = 1.00) firing 4 rounds would have a cumulative lethality effect (product) of 1.00 x 4 = 4.00. A comparison of one tube per system with another can be done by using this logic, if the time frame of firing is identical.

Figure III-63 provides these data, using a one minute time frame for all systems and their sustained rates of fire for that minute. The formula is:

(Lethality Index) x (Sustained ROF) = Lethality Product

System	Lethality Sustained ROF		Lethality Product
	Index	(RDS/1 Min)	
M29E1, 81mm	1.00	8	8.00
M19, 60mm	.52	18	9.36
XM224, 60mm	.77	20	15.40

Figure III-63 - Infantry Mortar Lethality Product

Using this simple logic, a more accurate and combat-oriented lethality comparison can be made. Round for round, the 81mm is more lethal; tube for tube, over equal periods of time, it is not. This juxtaposition occurs simply because, although the shell is smaller, the 60mm mortar system (especially the XM224) can fire significantly more rounds in the same period of time.

Applied to multiple tubes, results of this finding can further provide answers as to how many tubes of which systems will produce the same cumulative lethality. Figure III-63agraphically displays the relative lethality for one to ten tubes of each system firing for one minute at the sustained ROF.

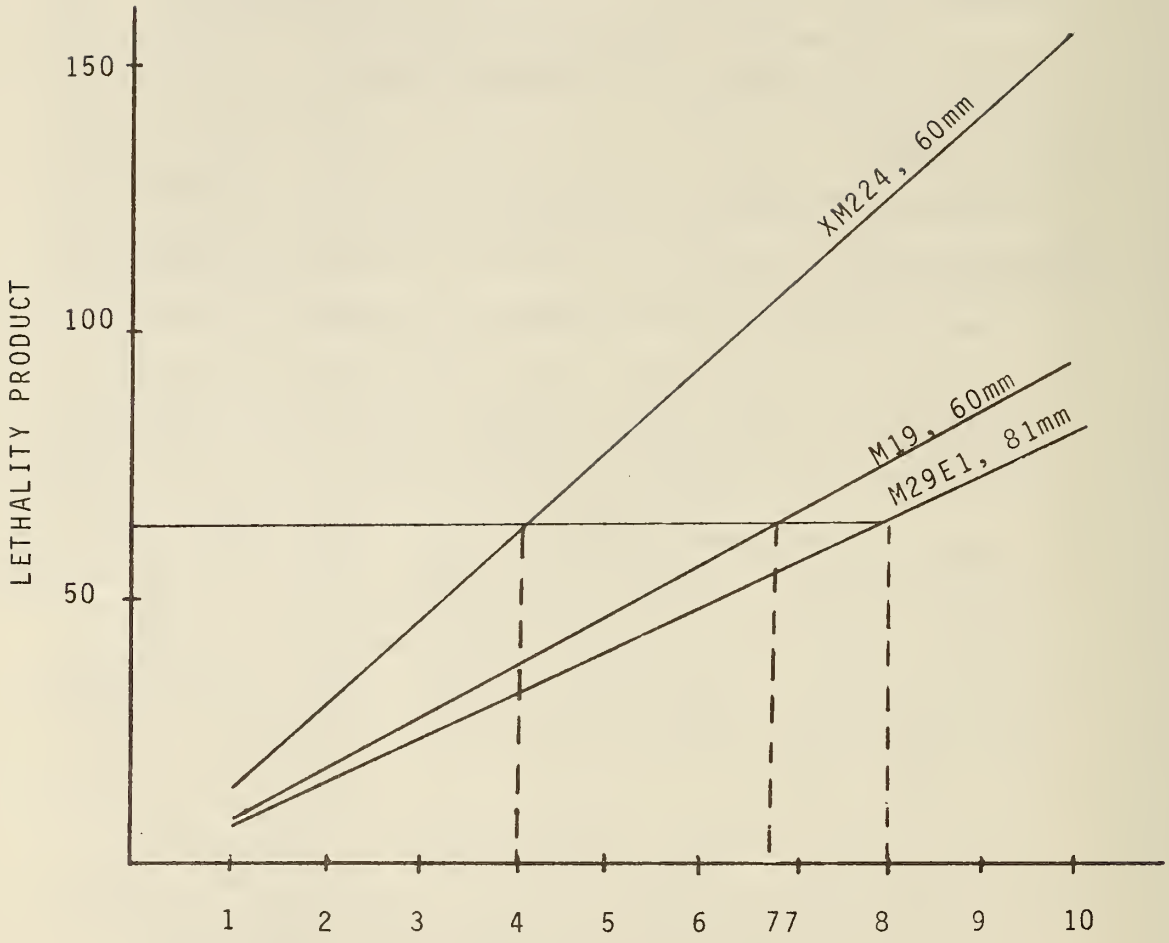


Figure III-63.A - Infantry Mortar Multiple Tube
Lethality Product

This graph indicates that five (4.1) XM224, 60mm mortar tubes produces the same cumulative lethality as seven (6.8) M19, 60mm mortars and as eight 81mm mortars. This information has greater applicability when considering mix and structure.

(d) Summary of Infantry Mortar MOEs. See figure III-64.

MOE	M29E1 81mm	M19 60mm	XM224 60mm
Range	Best	Good	Better
System Weight	Heavy	Light	Light
Crew-Size	7	3	3
Shell/Fuze Array	Lacks Delay Fuze	Lacks VT Fuze	Requires WP, Illum
Rate of Fire (Sustained/Min)	Slow	Fast	Fastest
Lethality			
Per Round	Best	Adequate	Better
Per Tube	Adequate	Better	Best

Figure III-64 - Summary of Infantry Mortar MOEs

On balance, the pending incorporation of the LWCMS, with its enhanced capabilities, and limited manpower resources, suggests that modification of the traditional 81mm mortar unit might be reasonable. This notion has not been of issue before because of more liberal resources and the clear, functional superiority of 81mm vs 60mm sytems.

Analysis of these systems has certainly not resolved this notion in extreme; that is, definitively demonstrating that a need no longer exists for the 81mm mortar due to the improved characteristics and capabilities of the XM224. Rather, it has shown a continuing need for the 81mm, if for no other reason that it has been not only field-tested, but combat-tested as well. However, this treatment has also suggested that the XM224 may well complement the 81mm system sufficiently *to allot a mix at the battalion level that will reduce personnel needs with no net loss in capability.*

- *Other.* The M30, 4.2" mortar was also considered for incorporation into a future infantry battalion structure. It was considered non-feasible exclusively due to the total system weight of 672.25 pounds per tube.

- *Future.* The Marine Corps has no further mortar system development programs ongoing, except the continuing development of the XM224, which has been discussed in sufficient detail.

An improved version of the 81mm mortar system has been pursued by the U.S. Army, until recently. This program, which was evaluating a fielded version of an 81mm mortar belonging to an allied nation has been suspended indefinitely. Technical difficulties dealing with blast overpressure at maximum ranges have resulted in withholding of a required safety certification.

Interest has also been expressed during this study in the Israeli version of the 81mm mortar termed the "TAMPELLA". Of comparable system weight (111.5 pounds) to our M29E1 it has an approximate maximum effective range of 4,600 meters. However, testing and evaluation of this system is precluded until resolution of the previously discussed. improved 81mm mortar of another allied nation.

- *Summary*

(1) A need for indirect fire infantry mortar system(s) exists.

(2) The M29E1, 81mm mortar demands a fairly large number of scarce manpower resources.

(3) The M29E1, 81mm mortar possesses certain superior characteristics and capabilities which suggests its continuance in the infantry battalion arsenal is mandatory.

(4) The XM224, 60mm LWCMS is a significantly enhanced infantry mortar system (above its M19 predecessor).

(5) The XM224, 60mm LWCMS lethality product indicates it to be a more lethal system than the M29E1, 81mm mortar.

(6) The XM224, 60mm LWCMS does not presently possess a developed WP or illumination round that will capitalize on its enhanced range capability.

- *Conclusions*

(1) A need for indirect fire, infantry mortar system(s) is established.

(2) The M29E1, 81mm mortar should be maintained in the infantry battalion arsenal though not necessarily as traditionally structured.

(3) The XM224, 60mm LWCMS will enhance indirect fire system lethality.

(4) The XM224, 60mm LWCMS shell array is incomplete pending development of WP and illumination designed for increased range.

(5) The XM224, 60mm LWCMS could potentially substitute for the M29E1, 81mm mortar.

o *Analysis of anti-armor weapons*

As with previous systems, range increases tend to cause resultant increases in weight and crew-size, except for the M47 DRAGON. Of the systems listed in figure III-65, only two (the LAAW and DRAGON) are currently organic to the infantry battalion. The incorporation of any, all, or none of the other systems into the infantry battalion's organic arsenal has been debated by several sources providing input to this study. This diversity of opinion has been the result of two primary factors:

System	Caliber	Max Eff Range (Point tgt)	Tot System Weight (loaded)	Ammo Wt (average round)	Crew Size
M72A1E1 (LAAW)	66mm	200m	4.7 lbs	2.25 lbs	1
M67 RR	90mm	450m	44.25 lbs	9.25 lbs	2-3
M47 (DRAGON)	-	1,000 m	30.87 lbs	25.29 lbs	1-2
M40 RR	106mm	1,100 m	499.0 lbs	37.23 lbs	4 (mounted)
M220A1 (TOW)	-	3,000-3,750	225 lbs (Unmounted)	53.9 lbs	5 (Sqd size- 2 tubes mounted)

Figure III-65 - Anti-Armor Weapons Data

(1) Inability to clearly quantify modern anti-armor requirements; and

(2) The diversity of potential Marine Corps involvements which arbitrate against mechanization of the infantry battalion.

History contains a number of examples of encounters between dismounted, unprotected infantry and mechanized, armored units. These examples are found into the current day, by reviewing the Vietnam War (specifically during the 1972 NVA Easter Offensive in I Corps), the Egyptian - Israeli Six-Day War, and the USSR invasion and occupation of Afghanistan. Interestingly, in each of these modern day examples, the armored forces were equipped with and trained by Soviet resources. The overt injection of these armored weapons into the hands of satellite nations by the USSR is sufficient

message that future USMC combat engagements may well confront them in some form.

In the same manner that our amphibious nature precludes specific design for a singular combat scenario, it just as emphatically mandates preparation for all types, including mechanized warfare. The infantry battalion's spectrum of roles does not accomodate total organic mechanization, but rather, relies upon the mechanism of task-organization to resolve this need.

This methodology, notwithstanding the realities of limited armored resources with which to task-organize, and an increasing reliance upon vertical assault mobility for the infantry battalion operating within an armored adversary arena, demands that the battalion be organically equipped with an adequate anti-armored arsenal. Organic systems must be sufficient to withstand and defeat *a reasonable first effort attack, ensuring survivability of the infantry battalion during the time period in which more adequate non-organic support can be maneuvered or otherwise brought to bear.* The current infantry arsenal does not meet this need.

The strengths and vulnerabilities of the USMC infantry battalion in an armor-intensive combat environment were studied through the gaming methodology discussed in section III B. From the results of the game, concern over the

anti-armor weaponry of the battalion was reinforced. This section discusses that subject.

A doctrinally deployed and attacking Motorized Rifle Battalion will be dispersed laterally across a frontage of 1,000 - 1,500 meters and approximately 3,000 meters in depth. This battalion would normally consist of 13 tanks and 32 motorized personnel carriers.

Currently, a USMC infantry battalion is configured to occupy a 3,000 meter lateral frontage on ideal terrain (which is coincidentally the most likely type for mechanized combat), with two rifle companies up (1,500 meters lateral frontage each) and one back. The depth of the battalion's security area can extend to the maximum effective range of its 81mm mortars (4,737 meters), but would probably be somewhat less due to the employment of the mortars in depth within the battle area.

Considering the actual availability of armored personnel carrying assets for distribution to infantry units, it is not unreasonable to postulate that some infantry battalions would be injected into the battle arena via vertical assault, thereby obviating task-organized armor protection, at least until overland link-up could take place. It is precisely this scenario that demonstrates the vulnerability of the battalion thus employed. Although this is admittedly a worst-case circumstance, it is suitable for consideration due to its reasonableness.

As can be seen in figure III-66, the extent of the battalion's security area is sufficiently large to accommodate two MRBs abreast (each deployed 1,500 meters laterally and 3,000 meters in depth), or one MRB attacking against a forward deployed USMC rifle company.

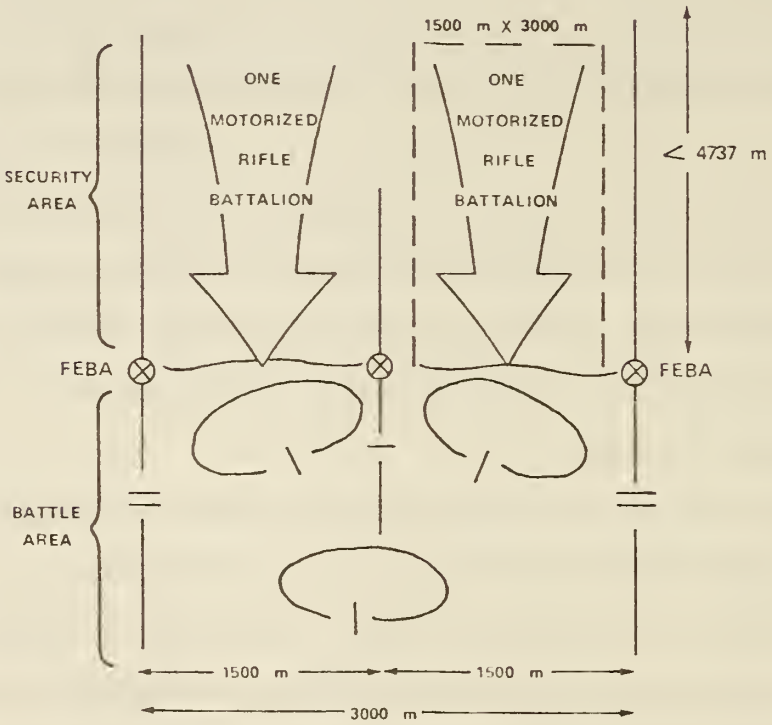


Figure III-66 - Defensive Posture of Helicopter-Lifted Battalion

Each attacking MRB has 45 weapons platforms (13 tanks, 32 troop carriers). The present day infantry battalion provides two organic anti-armor weapons systems -- the M72A1E1 LAAW with a maximum effective range of 200 meters (against moving targets) and the M47 DRAGON with a maximum effective range of 1,000 meters. The battalion commander has at his immediate disposal a total of 48 DRAGON missiles (3 per two man team, eight teams per section, two sections per platoon) with which to engage 45 weapons platforms of one MRB, or 90 weapons platforms of two MRBs (which, as previously shown, doctrinally could both enter his security area simultaneously.)

To ensure realistic perspective, it must be stated that not all of these platforms would have survived previous attacks by USMC supporting arms during their advance. It must just as realistically be cautioned, however, that the USMC battalion would have been degradated by enemy supporting arms as well. This fact nothwithstanding, the USMC battalion possesses sufficient assets to engage all enemy targets of one MRB, and half of the targets of two MRBs. This may appear adequate; however, three factors show that it is not:

(1) MRB rate of advance;

(2) M47 DRAGON maximum effective range; and

(3) M47 firing capability

Each of these could be compounded by the existence of enemy EW operations and battlefield obscuration means.

The Soviet-styled attacking MRB doctrinally maintains a cross-country rate of advance of 10 - 15 kilometers per hour. This rate is increased when under air or artillery attack.

The maximum effective range of the M47 DRAGON is 1,000 meters. This simply means that the infantry battalion commander cannot engage the advancing enemy force with organic weapons until it is within 1,000 meters of his forward deployed unit.

These first two factors when paired indicate that the MRB, closing at 10 - 15 km/hr, will traverse the infantry battalion's small arms/direct fire/anti-armor band in 4 to 6 minutes. See figure III-67.

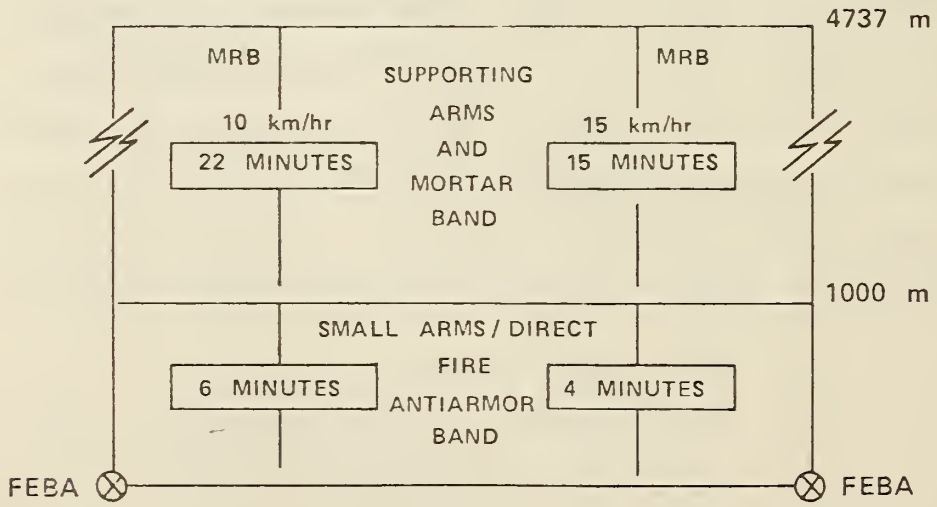


Figure III-67 - Enemy Closure Rates

Stated a bit differently, we must engage as many as 45 (or 90) targets with 48 or fewer missiles in 4 - 6 minutes. The employment of LAAWs is not forgotten; however, at a maximum effective range of 200 meters, LAAW gunners will be able to join the battle for only one minute.

At 1,000 meters, with the probability of kill of a M47 DRAGON firing against an armored target as 0.55, it will take 2 missiles to destroy one target. As this is a noncombat derived probability, it is possible that actual results would be even less. It is also likely that some DRAGON gunners will simultaneously engage the same target, further lessening overall kill ratio.

Although the infantry battalion possesses 48 DRAGON missiles, a DRAGON requires a tracking/sight system. The battalion currently possesses only one such tracker per 3 missiles (one per DRAGON team). The tracker is used to fire one missile, detached from the system and re-attached to the next missile.

Without even considering the Soviet demonstrated chemical ability, the injection of non-lethal smoke obscurants and battlefield gun smoke in and throughout this final, forward 1,000 meter band, will further reduce DRAGON capability. The optical tracker system of the DRAGON is vulnerable to such an environment.

In summary, these factors point to the possibility that such a battle will be won or lost within a four to six minute time period. In order to win, the battalion commander will probably exhaust virtually all of his anti-armor assets and must, thereafter, rely upon non-organic support and resupply to sustain further enemy assaults which will doctrinally follow quickly. This does not imply that a Marine infantry battalion cannot fight and win in an armored arena, because it can. It merely points out a degree of vulnerability in this regard.

Current systems

- *M72A1(E1) light anti-armor weapon (LAAW).* Mainly contributes to anti-armor capability in exceptionally close quarters.

The LAAW, although of quite limited range (200 meters against point, moving targets), is a highly desirable anti-armor munition due to its lightness (4.7 pounds, loaded), simplicity, and throw-away construction. It can be issued in varying quantities and densities based on the immediacy and severity of the threat. If coupled with the SMAW munition concept, this system affords a new measure of flexibility to arm the infantry unit with appropriate protective systems for close combat (MOBA, FPF, etc.) via "task-weaponization".

M47 DRAGON. The M47 DRAGON is the successor to the 106mm Recoilless Rifle. Its initial MOEs indicate it to be a progressive

anti-armor system capable of extreme penetration. It is relatively lightweight and can be operated by one Marine. It is a non-reusable system.

The M47 DRAGON is a limited system, too, as was discussed above. In addition to its wire-guided, optical tracking system, it is limited to firing no greater than 20-degrees up from the horizontal, and, more importantly, no greater than 20 -degrees depressed below the horizontal. This latter limitation prohibits firing DRAGON from elevated positions, such as rooftops. Additionally, its wire-guided tracking system is subject to electronic interference when firing across salt water which can degrade its range capability. Severe tracking difficulties are also encountered when firing into the sun or on a smoke-obscured battlefield.

Lastly, the M47 DRAGON does not currently possess a night tracker. Night firing can be accomplished to a degraded extent by use of battlefield illumination. This deficiency is being rectified by procurement of the AN/TAS -5, Night Tracker.

Other systems

- *M40, 106mm Recoilless Rifle.* Still available, this system was replaced by the M47 DRAGON at the infantry battalion level. It is a reusable launcher system that requires a mobile platform for offensive mobility. It can be unmounted for more static employment. Unmounted, the 106mm RR weighs 499 pounds. Its maximum effective range

is 1,100 meters, it fires three forms of ammunition (HEAT, HEP-T and anti-personnel) and requires a crew of four Marines.

This system was removed from the manned inventory on introduction of the DRAGON, and due to the termination of United States manufacture of its ammunition.

The 106mm was employed in Vietnam. Considering a number of DRAGON's vulnerabilities, retention of the 106mm as a portion of the infantry division's arsenal (ammunition procurement remains a problem) could be feasible.

M67, 90mm Recoilless Rifle. Data indicates this system to be heavy (44.25 pounds, loaded) in comparison to the M47 DRAGON (30.87 pounds) and the LAAW (4.7 pounds). Its range of 450 meters (maximum effective) in comparison to the DRAGON, and a crew size of 2 - 3 personnel, do not make the M67 especially attractive. A reusable launcher system, it fires only the M371E1 HEAT round, which weighs 9.25 pounds.

Due to its system weight, and the weight of ammunition, the 90mm RR would require a dedicated crew. In that a predominant anti-armor vulnerability lies in terms of systems density (best resolved by munition issuance), and in insufficient engagement ranges against rapidly closing forces (which the 90mm RR would not appreciably ameliorate), it

does not appear to be an effective candidate for the infantry battalion.

M220A1, TOW. This system is currently organic to the Antitank Company of the Tank Battalion, Infantry Division. It requires a five-man crew, weighs 225.0 pounds (loaded), and has a maximum effective range of 3,000 meters (3,750 in the improved version).

Due to its system and ammunition weights (53.9 pounds per missile), it is maintained as a mobile, mounted system on the M151A1 jeep. It may be removed from this platform and fired from a retractable tripod (tripod weight of 21 pounds is included in total system (loaded) weight of 225 pounds).

A TOW squad consists of five Marines, two launchers, (each separately mounted to a dedicated platform), 3 jeeps, and ten missiles. A non-mounted TOW squad could move one launcher system and 3 - 4 missiles by foot. Removal of the TOW from its platform has been accomplished in 90 seconds in evaluation testing, and replacement took the same time.

TOW limitations are similar to the M47 DRAGON, due to its wire-guided, optical tracking system. Sun effects, elevation and depression fans, over-the-water range limitations and battlefield smoke obscuration are common ailments.

The singular most positive characteristic of this system is its range capability of 3,000 - 3,750 meters. Using the same Soviet rate of advance and closure time as postulated

above, a TOW launcher system, either organic to the infantry battalion or attached to it, would *provide the infantry battalion commander with an effective engagement time of 15 - 22 minutes vice his current 4 - 6 minute period.* Employed in conjunction with DRAGON, the net effect of surviving a first attack is significantly enhanced.

The addition of one section of TOW to a battalion can produce, by itself, 28 of 45 (or 90) enemy mechanized casualties. However, this commences at ranges of 3,000 meters plus affording 15 - 22 minutes of time. Combined with the current DRAGON assets, which are still capable of inflicting 27 casualties above the TOW section's contribution, the infantry battalion is capable of defeating 55 of 45 (or 90) armored targets.

In other words, 122% of a MRB (or 61% of two MRBs) could be destroyed. As is evident, the addition of TOW to the infantry battalion's arsenal, either organically, or in support, dramatically increases its firepower, destructive capability, and probability of survival.

The M220A1 TOW, mounted on either a M151A1 jeep or M274 (MULE) platform is internally helicopter transportable. In an unmounted mode, it can be carried internally by the LVTP-7.

M2, .50 caliber machinegun. As discussed previously, the M2, .50 caliber machinegun possesses an antiarmor capability in the form of armor-piercing ammunition. The

development of a .50 caliber Saboted Light Armor Penetrator (SLAP) further enhances this system's potentiality in the antiarmor environment. However, incorporation of this weapon into the infantry battalion arsenal can best be achieved by the vehicular mounting or the "unmanned arsenal" concept as previously concluded, thereby affording the battalion commander one more additional asset with which to "task weaponize".

Mark 19, Mod 1 (XM174E1), 40mm Automatic Grenade Launcher. This high velocity weapon also possesses an armor penetrating round capable of defeating Soviet BMPs. As with the M2, .50 caliber machinegun, previous discussions and conclusions remain germaine. Incorporation (if procured) as a portion of an unmanned arsenal could provide the infantry battalion with still another asset.

Future systems. There are three programs which will influence the antiarmor weapons array. Two of these are Product Improvement Programs (PIP) of the TOW and DRAGON. All deal with improvements in tracking systems, warhead lethality, and range enhancement. As presented before in discussions of these systems, these improvements are vital, as both the DRAGON and TOW possess weaknesses in their present form.

The third is the U.S. Army's VIPER program, which the Marine Corps is monitoring. VIPER is the follow-on system to replace LAAW. The advent of this system would enhance the antiarmor array, particularly, in that its anticipated

effective range will double that of the LAAW. Procurement by the Marine Corps for issuance as a munition would be advantageous.

- *Summary*

(1) A need for organic antiarmor weapons systems exists.

(2) A broad mission spectrum precludes the infantry battalion from total organic mechanization.

(3) A broad mission spectrum, also, includes the potentiality of Marine infantry battalion employment against an armored force.

(4) The current infantry battalion does not possess adequate organic, antiarmor systems to defeat an opposing armored force of one to two Soviet MRBs.

(5) The current infantry battalion commander must conduct the preponderance of his antiarmor battle within 1,000 meters of his forward deployed units.

(6) Such a battle will most likely commence and terminate within four to six minutes.

- *Conclusions*

(1) The need for organic antiarmor weapons systems is established.

(2) A current infantry battalion, fighting an opposing armored force with only organic weapons would most likely not defeat it nor halt its advance.

(3) Current infantry battalion antiarmor weapons, though inadequate in their present form, should not be removed, but rather enhanced and provided in greater density.

(4) Other available antiarmor weapons including 90mm and 106mm recoilless rifles, and Mark 19 grenade launcher could be incorporated into the infantry battalion via the unmanned arsenal concept for employment by "task weaponization". The M2, .50 caliber machinegun could be incorporated via either vehicular mounting or the unmanned arsenal concept.

(5) The M220A1 TOW, as an organic weapon, would significantly enhance the combat capability and survivability of the infantry battalion. If retained at division level, a greater density of TOW is suggested.

- *Analysis of Air Defense Weapons.* Today's infantry battalion possesses no organic air defense weaponry (nor does the infantry division) except for small arms. Point air defense protection for division units is furnished by task-organized forward area air defense (FAAD) teams from the FAAD Battery of the Marine Air Control Group. These teams are equipped with the REDEYE missile launcher system. The MOE data for this weapon are presented in figure III-68.

Nomenclature	Range*	Altitude*	Weight	Crew-size
M41E2 REDEYE	3-5 km	10,000 ft.	29 lbs.	2

Figure III-68 - Antiair Weapons Data

*estimated

The notion of protective air defense for the infantry battalion, although not a new concept, has developed a more credible base in recent years with the rapidly growing threat posed by injection of Soviet-produced assault helicopters into the battlefield. The lethality of these heavily-armed helicopters has been demonstrated against ground forces in both Angola and Afghanistan.

The nature of the infantry battalion's mission precludes organic assignment of highly sophisticated antiair weaponry and command and control equipment to protect the battalion from all forms of air attack. However, simple systems with adequate combat-safe command and control designed to afford protection from enemy assault helicopters only deserve consideration.

Current System. Based on the premise that Marine infantry weapons must be light, possess adequate range capability, and require minimal personnel, the remainder of this section will consider only the REDEYE missile system, which meets these base-level criteria.

The present table of organization for the FAAD Battery consists of one battery per Marine Aircraft Wing. The battery is organized as shown in figure III-69. This structure provides for a total of 75 REDEYE teams per wing, each team comprised of two Marines.

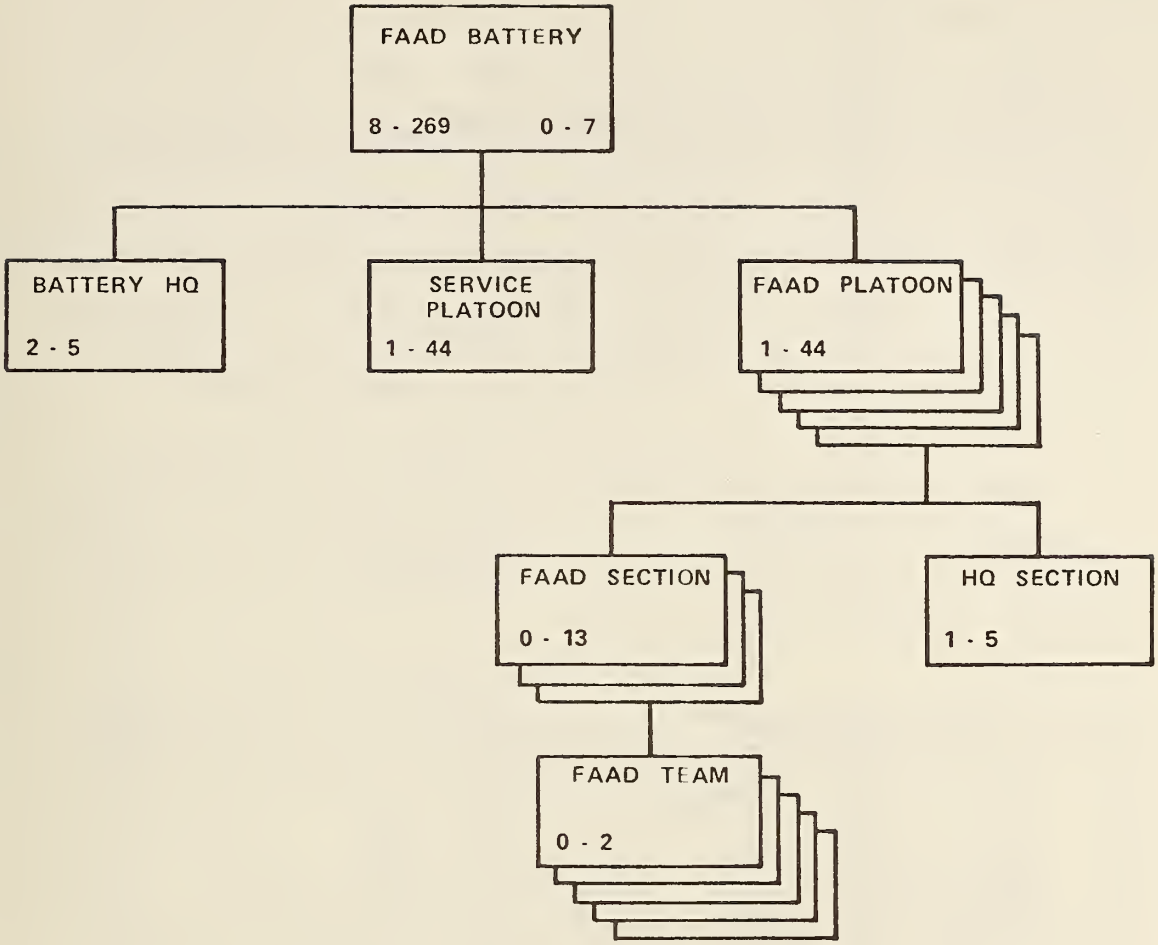


Figure III-69 - Organizational Structure of FAAD Battery

The FAAD Battery is normally task-organized as required to support the amphibious task force (ATF). Components of the battery as shown in figure III-70 are generally considered suitable to support the ATF indicated.

Supported Unit	FAAD Component	# of Teams
MAF	Battery	75
MAB	Platoon	15
MAU	Section	5

Figure III-70 - FAAD Component Support of ATFs

Command and control functionality is simplistically designed. Weapons control is maintained by the key personnel listed in figure III-71.

Key Personnel	Location
FAAD Battery Commander	SACC/DASC
FAAD Platoon Commander	Reg't'l FSCC
FAAD Section Leader	Battalion FSCC

Figure III-71 - FAAD Command and Control

High frequency communications are used to link the three command elements. The FAAD Battery Commander is linked to the tactical air operations center (TAOC), which maintains responsibility for fire direction. The FAAD section leader uses very high frequency communications to link with forward deployed REDEYE teams.

Forward deployment of REDEYE teams is necessitated by the over-the-ground range limitations of the M41E2 missile launcher system itself. Projection of the missile to the forward edge of a defensive FEBA requires it to be

launched from no greater than three to five kilometers to the rear of the FEBA. An infantry battalion will ideally deploy itself in depth up to 3,000 meters. If the REDEYE missile is to engage enemy air targets forward of the FEBA, it must by necessity be located within the infantry battalion's battle area, as shown in figure III-72.

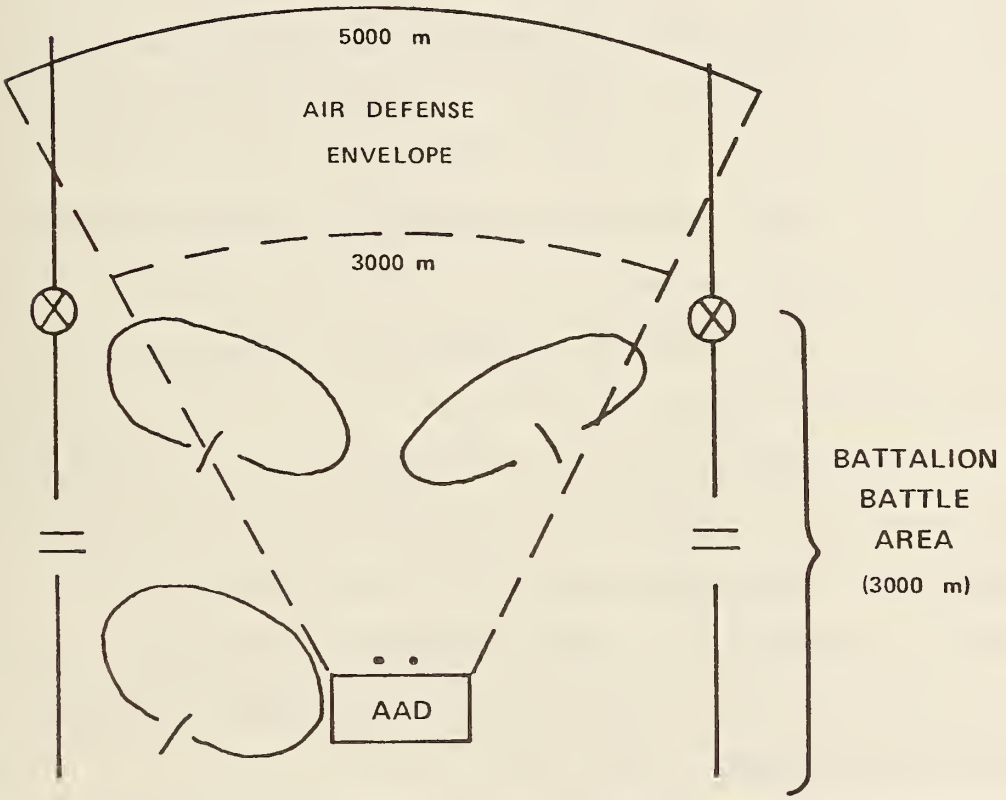


Figure III-72 - Forward Antiair Defense Envelope

Removal of the FAAD team from the proximity of the infantry battalion (i.e., further to the rear) would effectively eliminate the envelope of antiair protection afforded to the infantry battalion. With the envelope gone, responsiveness in the form of target acquisition is overshadowed by the larger impact of having to move the antiair system forward in time to achieve first engagement. Three factors indicate that this rear area employment should not occur:

(1) The low-level closing rate of Soviet-styled helicopter assault aircraft;

(2) Deficiencies in present early warning detection of low flying aircraft; and

(3) The saturation of electronic countermeasures (ECM) reflective of the nature of the future battlefield.

Any one of these three factors is sufficiently debiliating to preclude the timely movement of rearward-situated antiair missile units forward to achieve adequate engagement opportunity.

Protection of the infantry battalion against hostile aircraft has been considered by this study effort as sufficient if it is capable of thwarting enemy rotary-wing aircraft employment. The impact of Soviet-designed HIP and HIND-D assault helicopters adds an immediate three-dimensional threat to the mobility and maneuver of the

infantry battalion but the weaponry of the battalion does not answer that threat. Task-organized air defense assets are available but may not be as responsive as the future threat demands. Assets must be requested through ATF level, but the immediacy, urgency, and responsiveness which are required call for a less centralized technique.

- *Summary.*

(1) A need for forward deployed antiair protection of the infantry battalion exists.

(2) The range limitation of the REDEYE missile launcher system requires it to be located in proximity to the infantry battalion's battle area or zone of action.

(3) The threat environment (enemy helicopter closure rates, ECM) and current day, low-level, early warning system deficiencies mandate deployment forward to achieve target engagement responsiveness.

(4) The process of task organization may not provide adequate response against the threat.

- *Conclusions*

(1) The need for forward deployed antiair protection of the infantry battalion is established.

(2) The organic structuring of antiair systems within the infantry battalion is feasible.

(3) The organic structuring of antiair systems within the infantry battalion would provide the greatest enhancement of response and protection.

(4) The control of air defense assets is not currently within the expertise of the infantry officer; some time would be required to correct this.

(5) Placement of antiair systems at some organizational position within the division but not in the infantry battalion is a suitable alternative.

Weapons Mix

Suggestion of an optimal weapons mix for the Marine infantry battalion is difficult. A dichotomy emerges as we attempt to blend a finite set of weapons systems and types into a fixed-size structure that must have the potential to execute a nearly infinite variety of missions. It is this reasoning that the concept of task organization has been so important to Marines. Task organizing strengthens the close combat unit with additional non-organic assets which enable it to better execute its mission.

In considering the question of a "most likely threat", a counter issue arises. The organizational structure must provide a mix of weapons systems which are capable of executing a close combat mission against the most likely threat. The process, however, should not cease there. Since other close combat missions are also conceivable, more suitable systems for these environments must also be made available in some manner. That is, the battalion commander may select the most appropriate mix to engage his immediate threat. From outside agencies he can gain

heavy support of long range and a highly mobile nature (artillery, CAS, tanks, etc.) through task organization. From within his own arsenal, however, he selects additional assets essential to the immediate battle via what could be termed, task weaponization. Figure III-73 illustrates this concept.

	COMBAT ENVIRONMENT			
Weapons Type(s)	Open Terrain, Armor Intensive	Closed Terrain, Counterguerilla	Amphibious Assault	MOBA
Small Arms	M16A1 M203 M60 MG .50 Cal MG*	M16A1 M203 M60 MG	M16A1 M203 M60 MG	M16A1 M203 M60 MG
Assault Wpns		SMAW	SMAW	SMAW
Indirect Fire	M29E1, 81mm XM224, 60mm	XM224, 60mm	M29E1, 81mm XM224, 60mm	M29E1, 81mm XM224, 60mm
Antiarmor	DRAGON TOW* M72 LAAW XM174, 40mm GL*	M72 LAAW	DRAGON TOW* M72 LAAW	DRAGON TOW* M72 LAAW M67, 90mm RR*
Air Defense	REDEYE*		REDEYE*	REDEYE*

*Not presently programmed or available organically

Figure III-73 - Example of Task Weaponization

Using the concept expressed by figure III-73 as a guide, the mix of battalion weapons was designed according to a three step process:

(1) Those weapons essential for the conduct of the amphibious assault should all be within the battalion arsenal and should be manned;

(2) Those weapons essential for combat against the most likely threat (i.e., Soviet-style and armored) should be within the battalion arsenal, and should be either manned or unmanned;

(3) Those weapons which are effectively employed in any three environments should be within the battalion arsenal and should be manned.

Applying these three criteria produced a mix of organic weapons systems as shown in figure III-74.

This weapons system mix provides the battalion with the flexibility to task weaponize for virtually any combat environment and adversary. In addition to the heavy support available from the task organization process, firepower density can be altered to best meet and defeat the direct threat.

Those systems which are neither ordnance items, nor unmanned, form the core of the infantry battalion organizational weapons structure. The exact nature of that structure is dependent upon not only the weapons systems themselves (especially crew size) but the firepower density balance,

Weapons	Criteria	Remarks
Small Arms		
M16A1	(1),(2),(3)	
M203	(1),(2),(3)	
M60, 7.62mm MG	(1),(2),(3)	
M2, .50 cal MG	(2)	
Assault Weapons		
SMAW	(1),(3)	Ordnance
Indirect Fire		
M29E1, 81mm	(1),(2),(3)	
XM224, 60mm	(1),(2),(3)	
Antiarmor		
DRAGON	(1),(2),(3)	
TOW	(1),(2),(3)	
M72 LAAW	(1),(2),(3)	Ordnance
XM174, 40mm	(2)	Unmanned
M67, 90mm RR	None	
Air Defense		
REDEYE	(1),(2),(3)	

Figure III-74 - Infantry Battalion Weapons Mix

the number of maneuver elements desired, and the unit manpower constraint. Those systems which are unmanned are maintained in the armory. Unmanned systems must be manned by Marines with cross training in their proper use and employment; designation of specific individuals for such cross training would be discretionary. For example, a battalion commander may desire all M60 machinegun crews

be cross trained with the M2, .50 caliber machinegun; another commander may ensure that jeep drivers are cross trained with this system.

Those systems indicated as ordnance items would be requested and issued in the density desired by the commander. As such, he may weight his firepower strength with the system most appropriate to the immediate threat (antiarmor - LAAW or fortified positions/built up areas - SMAW or a blend of both if both threats are considered equal).

- *Summary*

(1) The most appropriate weapons system mix for the infantry battalion would vary depending on the actual combat environment in which the battalion is employed.

(2) Resources that are available for weighting the mix include task organization and task weaponization.

(3) Task organization may not provide the exact resources necessary to engage the immediate threat.

(4) Task weaponization enhances the infantry battalion's flexibility.

(5) Task organization and task weaponization are mutually exclusive, but complimentary.

- *Conclusions*

(1) Both task organization and task weaponization provide needed resources to the infantry battalion.

(2) The creation of an unmanned arsenal within

the infantry battalion provides the means through which task weaponization can take place.

(3) Task weaponization is a concept to enhance the probability of success of an infantry battalion engaged in close combat.

- Weapons System/Structure Integration

In that the end strength of the future battalion must be about 900, the distribution of weapons in terms of density is constrained. Having determined what systems are essential for the battalion, the process now evolves to determining how many of each can be included in the finite structure. Additionally, the final array must be balanced and must maximize the firepower capability of the unit, not any specific weapon or type.

- *Blend.* Traditional, modern Marine infantry battalions have maintained a firepower ratio between three weapons system types of approximately 1:1:1. That is, one-third of the battalion's firepower is vested in small arms, one-third is indirect fire systems, and one-third dedicated to antiarmor weapons. This alignment does not seem to have a particular reason for being, nor is it necessarily appropriate for the future battlefield. Nevertheless, it is not an unreasonable guideline for ensuring that the final structure is not over weighted or "scenario-dependent". Commanders can weight their firepower in preparation for a specific threat by task organization and task weaponization.

The measure for determining the blend ratio is the weapons effectiveness index/weighted unit value (WEI/WUV) methodology. Section VII, wherein preferred infantry battalion structures are discussed, provides these values for each candidate structure.

Weapons versus manpower

Working within a manpower ceiling, it quickly becomes evident that the density of weapons systems is limited. Ultimately, tradeoffs must be considered. If a particular system is absolutely essential to the structure, then it will require a certain crew size to man it effectively.

Based on the aggregation of weapons crews, including individual riflemen, a general battalion personnel size is determined. Since certain systems must be limited or even considered, so that the total size of the battalion can be kept within its limit, the following points were considered in determining those systems to be funded/limited.

- *Summary*

(1) Current organic infantry battalion weapons are insufficient to meet and defeat the most likely threat;

(2) Current weapons mix imposes a two-dimensional restraint upon todays infantry battalion;

(3) Current weapons do not provide adequate standoff ranges;

(4) Ammunition distribution and individual load-carrying weights of the infantryman are critical issues.

(5) Seemingly minute alterations of weapons system mix/density at low levels have considerable impact in terms of personnel requirements for the battalion as a whole, thus requiring further tradeoffs.

(6) Current weapons system mix/density is inadequate, both in terms of raw firepower and in terms of defeating the most likely threat.

(7) Despite the 900-man personnel constraint, considerable improvement can be achieved in terms of firepower and ability to defeat the threat without forfeiting balance, maneuver, or essential command, control, or service functions.

- *Conclusions*

Certain conclusions can be drawn which serve as the foundation for structuring the recommended infantry battalions as they appear in Chapter VII.

(a) Not all weapons systems are appropriate for incorporation into an infantry battalion of 900-man size.

(b) Current organic systems, although generally adequate as separate entities, do not provide optimal firepower nor mix solutions for the battalion as a whole.

(c) Current organic systems allow the battalion commander to engage an immediate three-dimensional threat in only two dimensions.

(d) Current organic systems do not provide sufficient depth, in terms of redundancy and density, to meet the threat with adequate standoff capability.

(e) Weapons systems do exist (or are in advanced stages of development or procurement) which, if integrated, could significantly enhance firewpoer capability and battlefield survivability.

IIID. NUCLEAR VULNERABILITY ASSESSMENT

- *Methodology*

A computer assisted model was developed to evaluate battalion vulnerability as a function of the organizational structure. Inputs consisted of: a matrix representing lethality of the chosen weapon; a grid depicting likelihood of aiming points for the employment of nuclear weapons; delivery error information; and a matrix showing deployment configuration of the structure under consideration. Direct outputs were maximum losses and expected losses.

Using the aiming point information and delivery accuracy tables, a matrix was produced which provided the probability of a nuclear weapon hitting any location in the area of concern. Lethality data was a matrix showing percentage of losses as a function of distance from the blast area; and force deployment was a matrix showing the number of personnel in each location within the area of concern. The model moves the blast through each location in the area and evaluates the personnel losses for each blast. Maximum losses are identified and, using the probability of impact information, the expected losses in the area are determined. Maximum losses correspond to a situation of perfect red intelligence (and weapon delivery). The expected losses correspond to no red knowledge of blue positions, with aiming based only on map reconnaissance, and no delivery error. For each deployment and aiming scheme being evaluated, the

lethality and delivery error were varied to yield a set of data indicating the vulnerability to nuclear weapons for the deployment.

Calculations were done in three phases using different sources input: (1) a pilot study with deployments in a simplified scenario; (2) actual battalion deployment results from the wargame described in section IIIB; (3) battalion deployments on the wargame terrain but with a slightly different scenario. The battalion structures used in this analysis correspond to alternatives A, B, and C detailed in section VII. The development of input parameters required for the calculations is described below.

Deployment Matrices - For the second phase calculations, deployment matrices reflect the troop positions at selected moments of the wargame. For the pilot and third phase calculations, Marine officers (LtCol and Maj) were asked to deploy each alternative battalion, based on a terrain map, to establish blocking positions against a red advance. The simplified terrain map for the pilot effort is shown in figure III-75. The other scenarios used the same map as the wargame, figure III-76. The threat of nuclear weapons was made known. The officers positioned the units of each battalion to, in their opinions, best utilize the capabilities of each structure. These troop positions were represented as the number of men occupying each 500 meter square. Personnel were considered

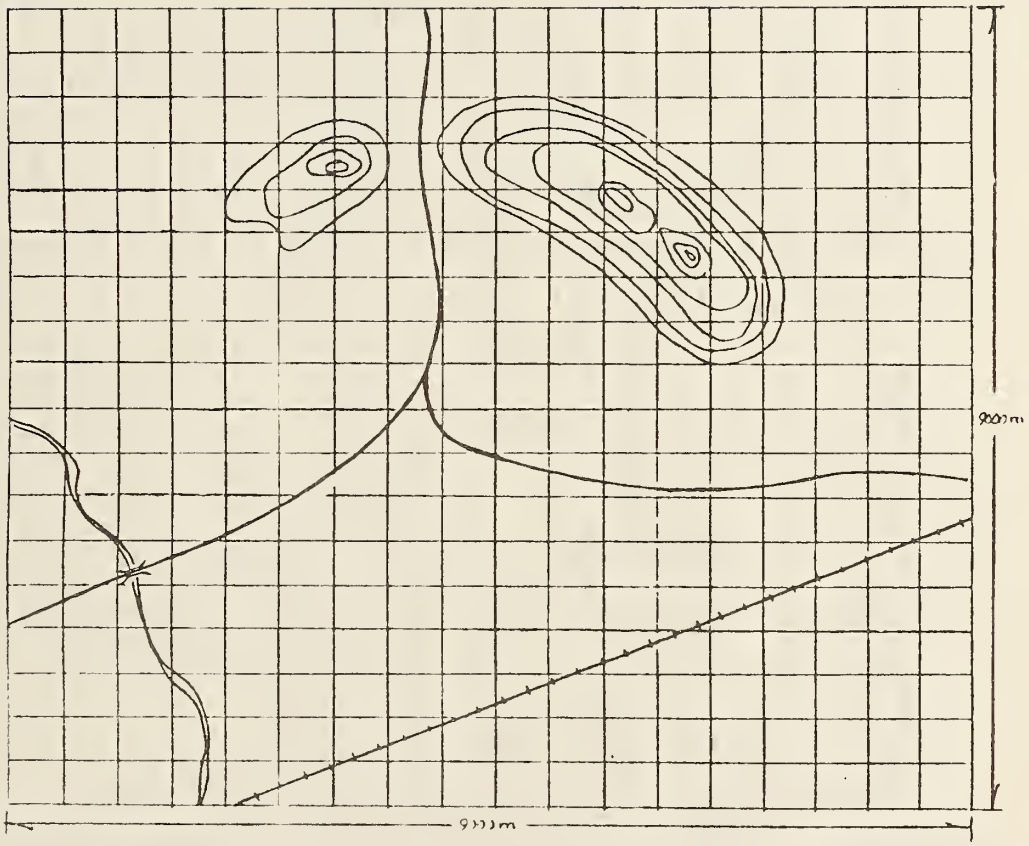


Figure III-75 - Situation Map for Pilot Study with 500 Meter Grid Squares

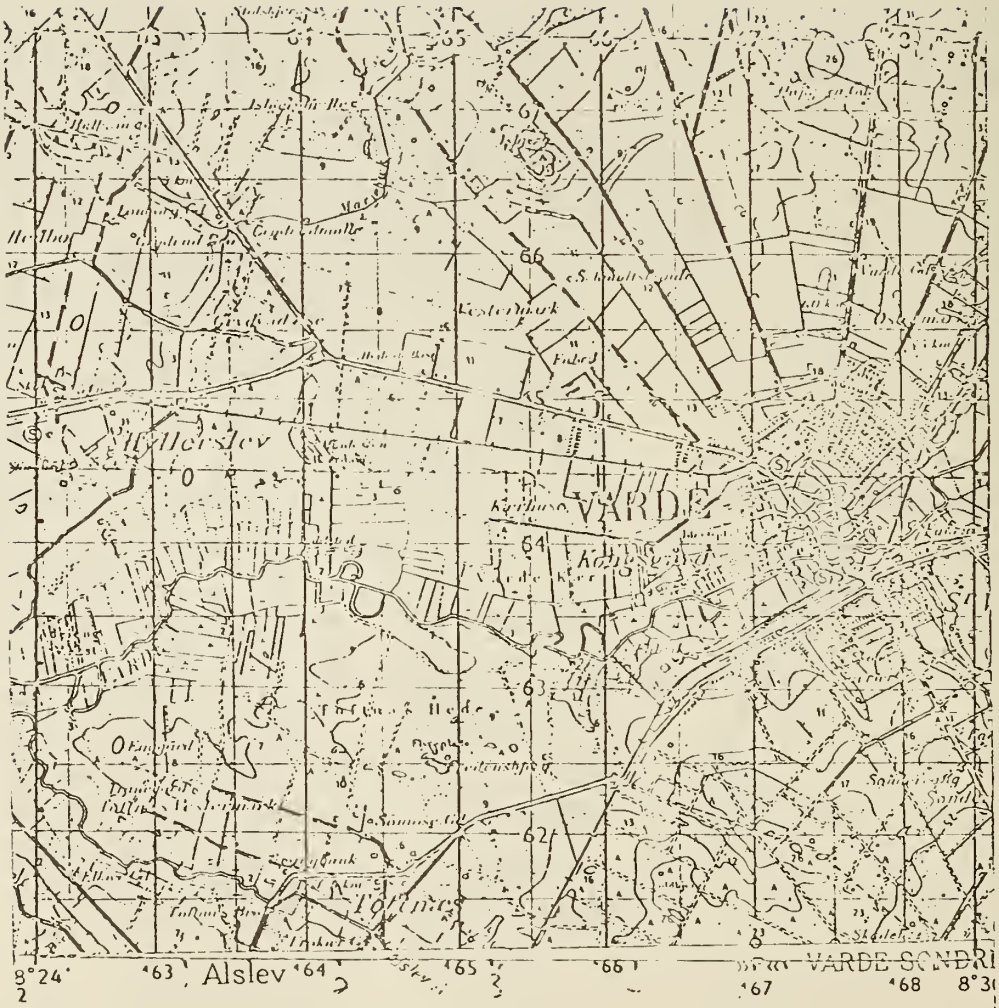


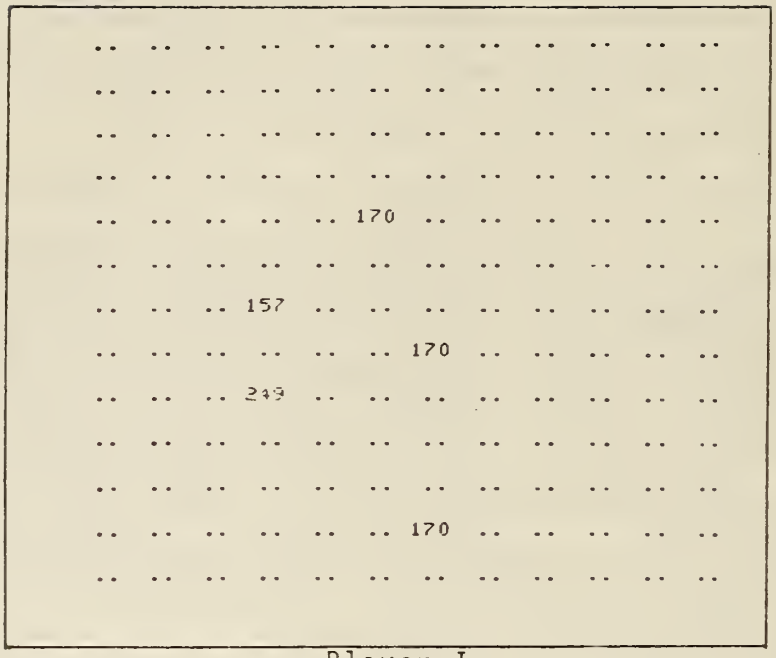
Figure III-76 - Terrain Map Used in the Wargame

to be evenly distributed within the square they occupied. Thus, to avoid dispersion artifact, every effort was made to keep from splitting a company between two squares unless that disposition was specified. Sample deployment matrices are shown in figures III-77, III-78, and III-79.

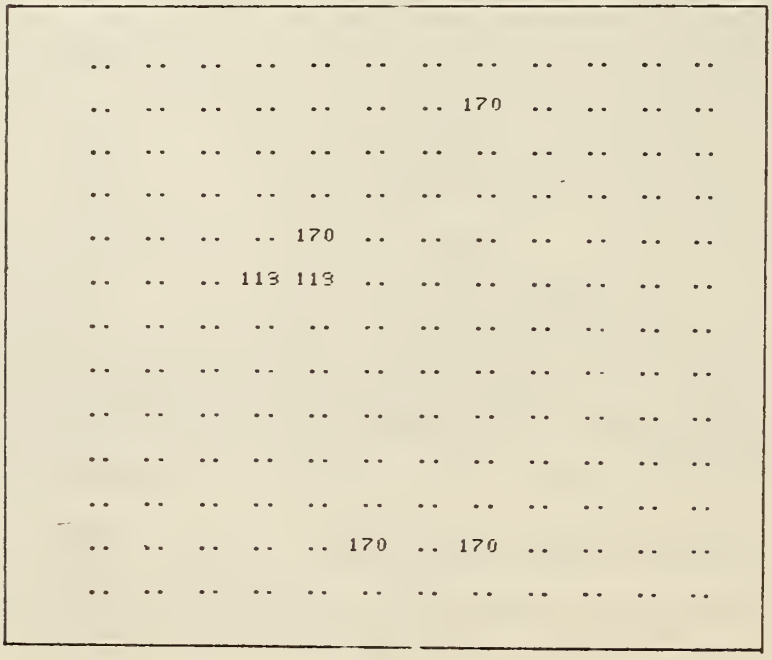
Lethality - Five lethality matrices, figure III-80, were developed which represent "small" through "large" yields and provide percentages of (exposed) personnel lost as a function of distance from the blast center. Each matrix was derived from source documentation and depict representative yields rather than showing precise kill probability for any particular weapon. Each element of the matrices represents a 500 meter square of terrain.

Delivery Accuracy - The same basic approach to accuracy was used. Three accuracy tables, figure III-81, were used as representative bands of accuracy. They represent the probability of impact in a particular location as a function of the distance of the location from the aiming point.

Aiming Point - Aiming points are necessary to determine expected casualty levels in the analysis. If there were no position dependence for the impact probability (uniform probability), deployment would have no affect on expected losses. Probability of aiming at a particular location in an area is a function of the enemy's estimate of how friendly forces might be employed and his desire to neutralize a particular location.

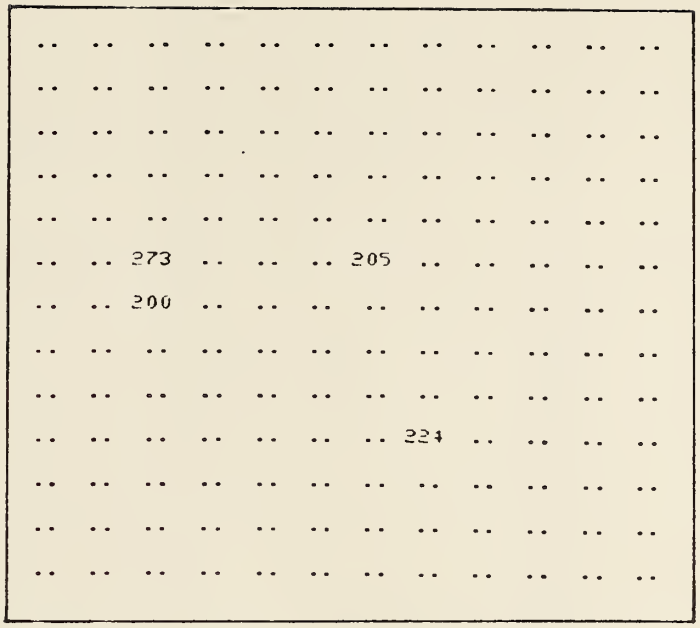


Player I



Player II

Figure III-77 - Sample Deployments for Structure A Using Wargame Terrain



Player I

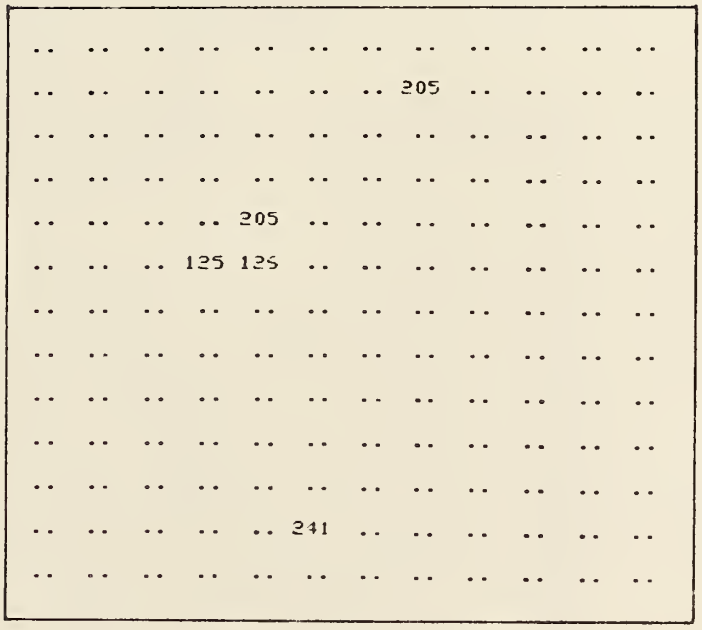


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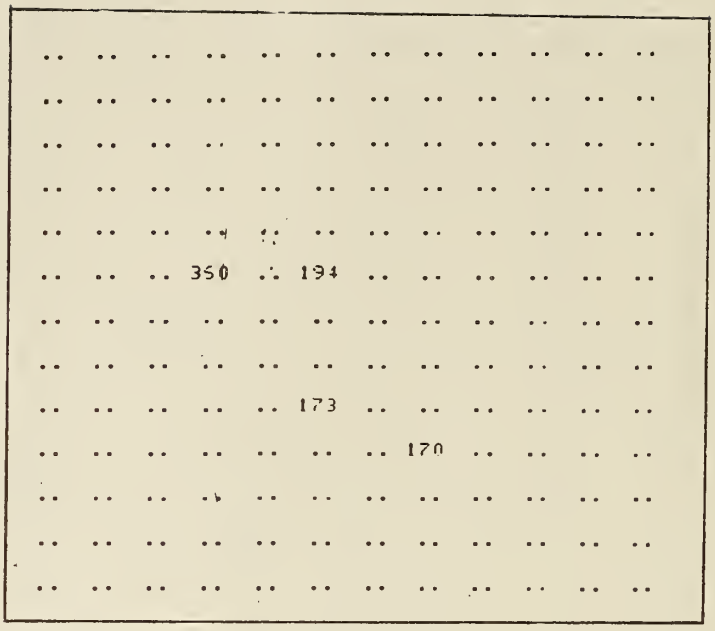
Figure III-78 - Sample Deployments for Structure B Using Wargame Terrain



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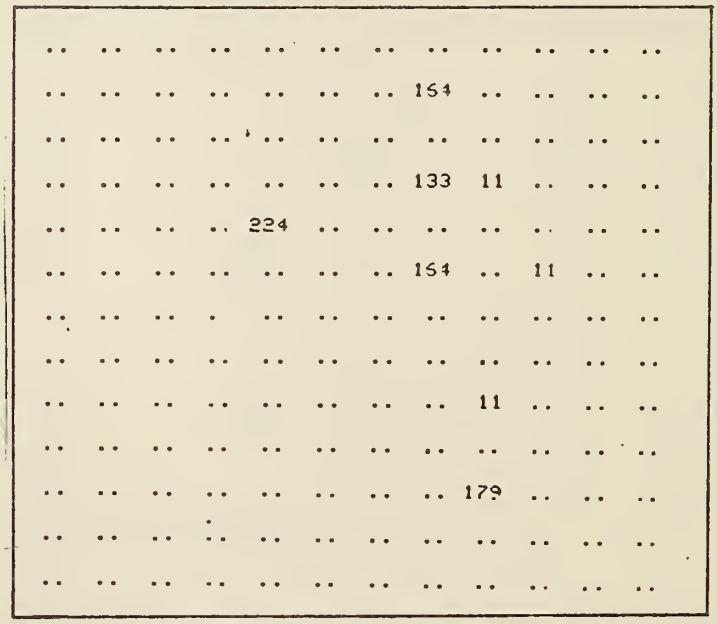


Player II

Figure III-79 - Sample Deployments for Structure C Using Wargame Terrain

.04	.06	.07	.06	.04
.06	.13	.21	.13	.06
.07	.21	.91	.21	.07
.06	.13	.21	.13	.06
.04	.06	.07	.06	.04

Level 1

.06	.09	.10	.09	.06
.09	.19	.32	.19	.09
.10	.32	.96	.32	.10
.09	.19	.32	.19	.09
.06	.09	.10	.09	.06

Level 2

.05	.08	.10	.10	.10	.08	.05
.08	.14	.20	.24	.20	.14	.08
.10	.20	.40	.56	.40	.20	.10
.10	.24	.56	.98	.56	.24	.10
.10	.20	.40	.56	.40	.20	.10
.08	.14	.20	.24	.20	.14	.08
.05	.08	.10	.10	.10	.08	.05

Level 3

.06	.09	.10	.11	.12	.11	.10	.09	.06
.09	.10	.15	.19	.19	.19	.15	.10	.09
.10	.15	.21	.32	.37	.32	.21	.15	.10
.11	.19	.32	.57	.77	.57	.32	.19	.11
.12	.19	.37	.77	.99	.77	.37	.19	.12
.11	.19	.32	.57	.77	.57	.32	.19	.11
.10	.15	.21	.32	.37	.32	.21	.15	.10
.09	.10	.15	.19	.19	.19	.15	.10	.09
.06	.09	.10	.11	.12	.11	.10	.09	.06

Level 4

.09	.11	.15	.17	.19	.17	.15	.11	.09
.11	.16	.20	.26	.29	.26	.20	.16	.11
.15	.20	.31	.45	.50	.45	.31	.20	.15
.17	.26	.45	.72	.97	.72	.45	.26	.17
.19	.29	.50	.97	.99	.97	.50	.29	.19
.17	.26	.45	.72	.97	.72	.45	.26	.17
.15	.20	.31	.45	.50	.45	.31	.20	.15
.11	.16	.20	.26	.29	.26	.20	.16	.11
.09	.11	.15	.17	.19	.17	.15	.11	.09

Level 5

Figure III-80 - Weapon Lethality Matrices for Exposed Personnel

.93

Small error

.05 .05 .05

.05 .50 .05

.05 .05 .05

Medium Error

.02 .02 .02 .02 .02

.02 .05 .05 .05 .02

.02 .05 .25 .05 .02

.02 .05 .05 .05 .02

.02 .02 .02 .02 .02

Large error

Figure III-81 - Delivery Error Matrices

Realistically, this is the minimum amount of information required by a red commander for use of nuclear weapons.

Likely aiming points for the model runs were obtained by having military officers play the role of enemy commander. Probabilities of aiming at a particular location were averaged over 3 "enemy" commanders to provide the aiming point probabilities for each location in each scenario. Aiming point probabilities used are shown in figures III-82 and III-86. Impact probability matrices generated from aiming points and delivery error are shown in figures III-83 through III-88.

• *Discussion*

Pilot Study - A pilot study was made using a schematic map of the area of operations as shown in figure III-75. The simple terrain included major and minor high ground, roads with one junction and a bridge and a stretch of railway. In all, about six significant features on which to structure a defense. A single player positioned the units of the battalion alternative structures (alternatives A, B, and C-refer to Section VII) and a single officer rated probable targets within the area of operations.

The results (figure III-89) bear the same relations between battalion structures regardless of the size of the blast (results of Level 1 yield are not shown). Maximum personnel casualties are least for the four rifle company alternative, structure A and highest for structure B, with three rifle companies. The

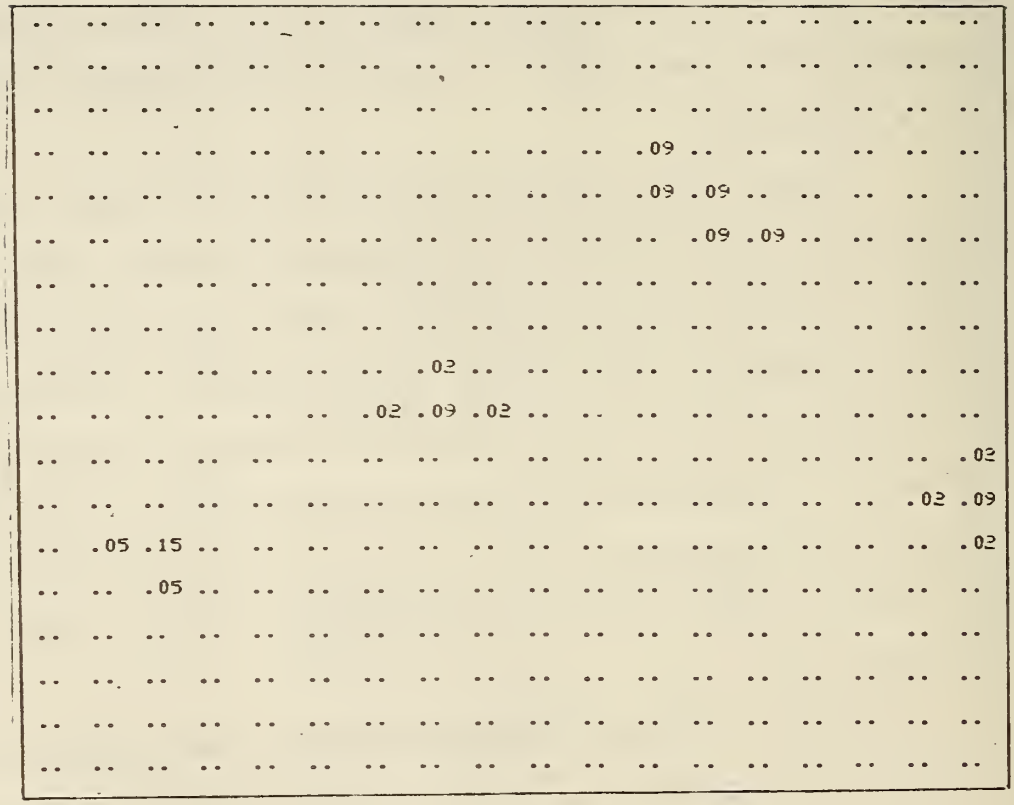


Figure III-82 - Aiming Point Probabilities for Pilot Study

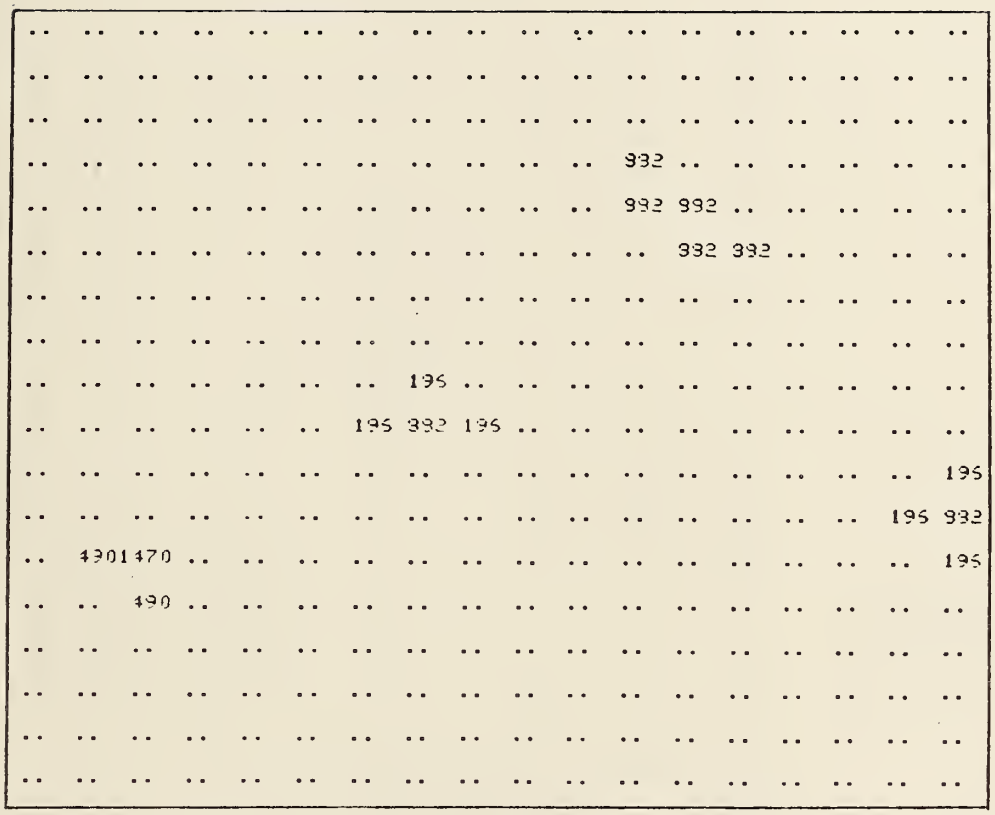


Figure III-83 - Pilot Study Impact Probabilities (X 10,000) for Small Delivery Error

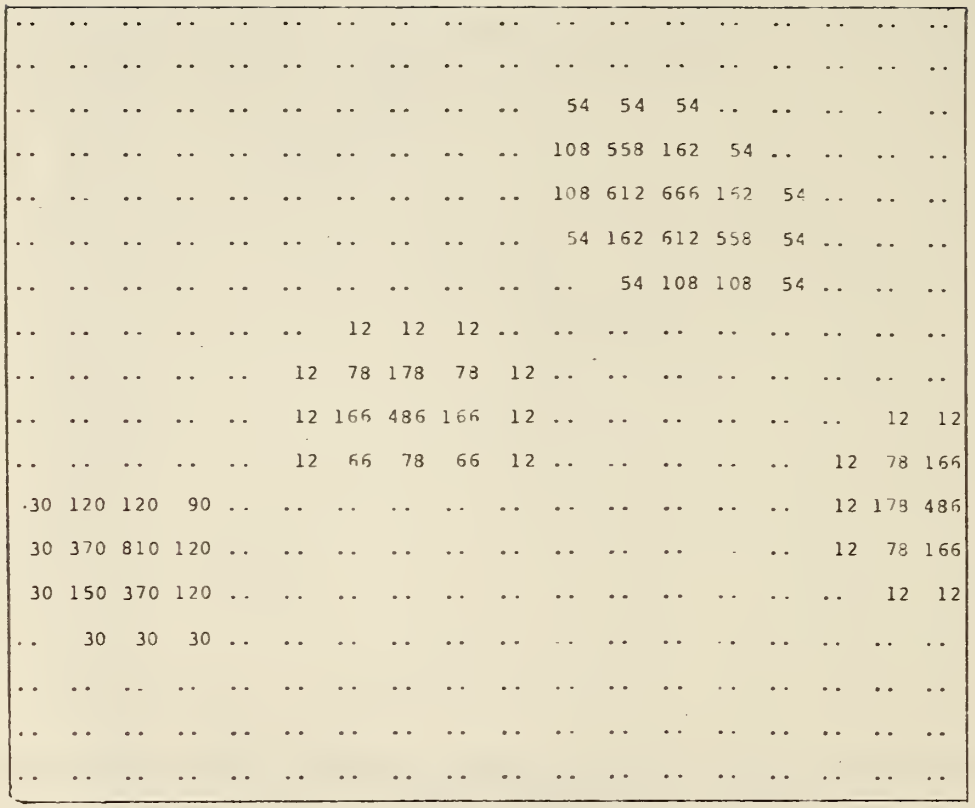


Figure III-84 - Pilot Study Impact Probabilities (X 10,000) for Medium Delivery Error

..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	18	18	18	18	18	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	36	81	81	81	54	18	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	36	126	360	171	117	54	18	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	36	126	387	414	171	81	18	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	36	99	171	387	360	81	18	..	..	..	..
..	..	..	..	..	..	4	4	4	4	22	54	99	126	126	81	18	..	..	..	..	
..	..	..	..	..	4	26	36	36	36	26	22	36	36	36	36	18	..	..	..	..	
..	..	..	..	..	4	32	69	117	69	32	4	..	..	..	..	4	4	4	4	4	
..	..	..	..	..	4	32	111	264	111	32	4	..	..	..	4	26	32	32	32	22	
10	40	40	40	40	34	32	63	59	63	32	4	..	..	..	4	36	69	111	63	26	
10	65	110	110	95	44	22	26	26	26	22	4	..	..	..	4	36	117	264	59	26	
10	65	230	440	110	40	..	..	..	..	..	..	..	..	..	4	36	69	111	63	26	
10	65	125	230	110	40	.	..	..	..	..	..	..	..	..	4	26	32	32	32	22	
10	50	65	65	65	40	..	..	..	..	..	..	..	..	..	..	4	4	4	4	4	
..	10	10	10	10	10	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	
..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	

Figure III-85 - Pilot Study Impact Probabilities (X 10,000) for Large Delivery Error

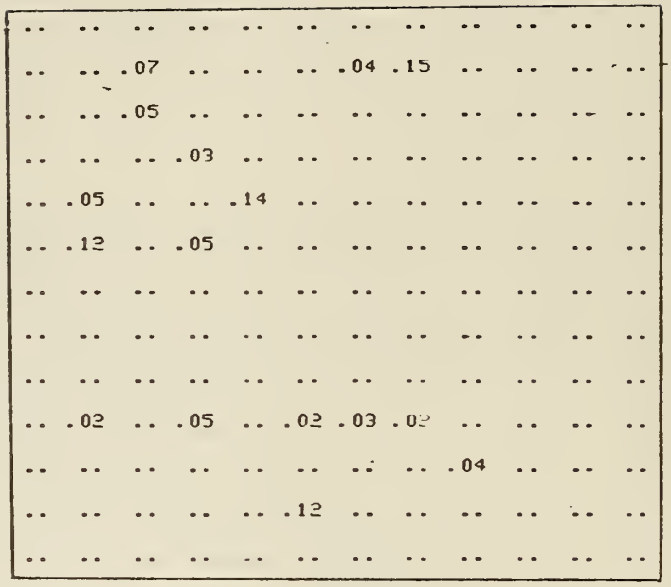


Figure III-86 - Aiming Point Probabilities

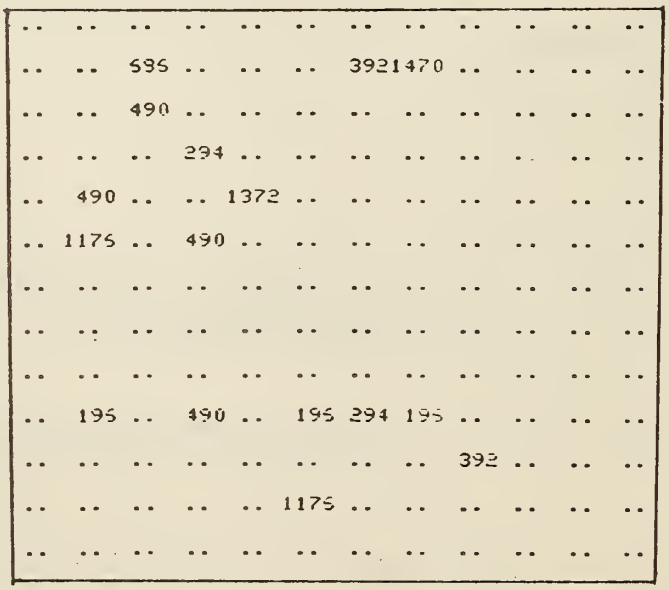


Figure III-87 - Impact Probability (X 10,000)
for Small Delivery Error

..	42	42	42	..	24	114	114	90	..	..	..
..	72	390	72	..	24	290	774	90	..	..	..
..	72	310	90	18	24	114	114	90	..	..	..
30	60	78	264	102	84	..	..	..	..	..	..
102	322	150	132	748	84	..	..	..	..	..	..
102	630	132	334	114	84	..	..	..	..	..	..
72	72	102	30	30	..	..	..	..	..	..	..
..	..	..	..	..	..	..	..	..	..	..	..
12	12	42	30	42	30	42	30	12	..	..	..
12	100	42	250	42	118	174	142	36	24	..	..
12	12	42	30	114	102	114	54	212	24	..	..
..	..	..	..	72	600	72	24	24	24	..	..
..	..	..	..	72	72	72	..	..	..	..	..

Medium Delivery Error

..	14	14	14	14	22	38	38	38	38	30	..	..
..	24	45	45	45	32	50	95	95	93	30	..	..
..	24	66	213	66	33	56	179	410	93	30	..	..
10	34	76	218	113	75	84	123	95	93	30	..	..
34	73	104	141	231	127	124	66	38	38	30	..	..
34	95	216	163	154	414	86	28	..	..	..	..	..
34	86	353	144	240	101	86	28	..	..	..	..	..
34	70	80	123	87	53	38	23	..	..	..	..	..
28	28	48	48	52	30	34	14	14	10	4	..	..
4	10	20	35	33	41	39	43	37	24	12	8	..
4	10	62	35	162	65	105	130	115	36	24	9	..
4	10	20	35	57	101	99	103	73	120	24	8	..
4	4	14	14	42	90	336	32	58	30	24	8	..
..	..	..	..	..	24	60	60	58	32	8	8	8	..
..	..	..	..	..	24	24	24	24	24	..	..	..	..

Large Delivery Error

Figure III-88 - Impact Probabilities (X 10,000)

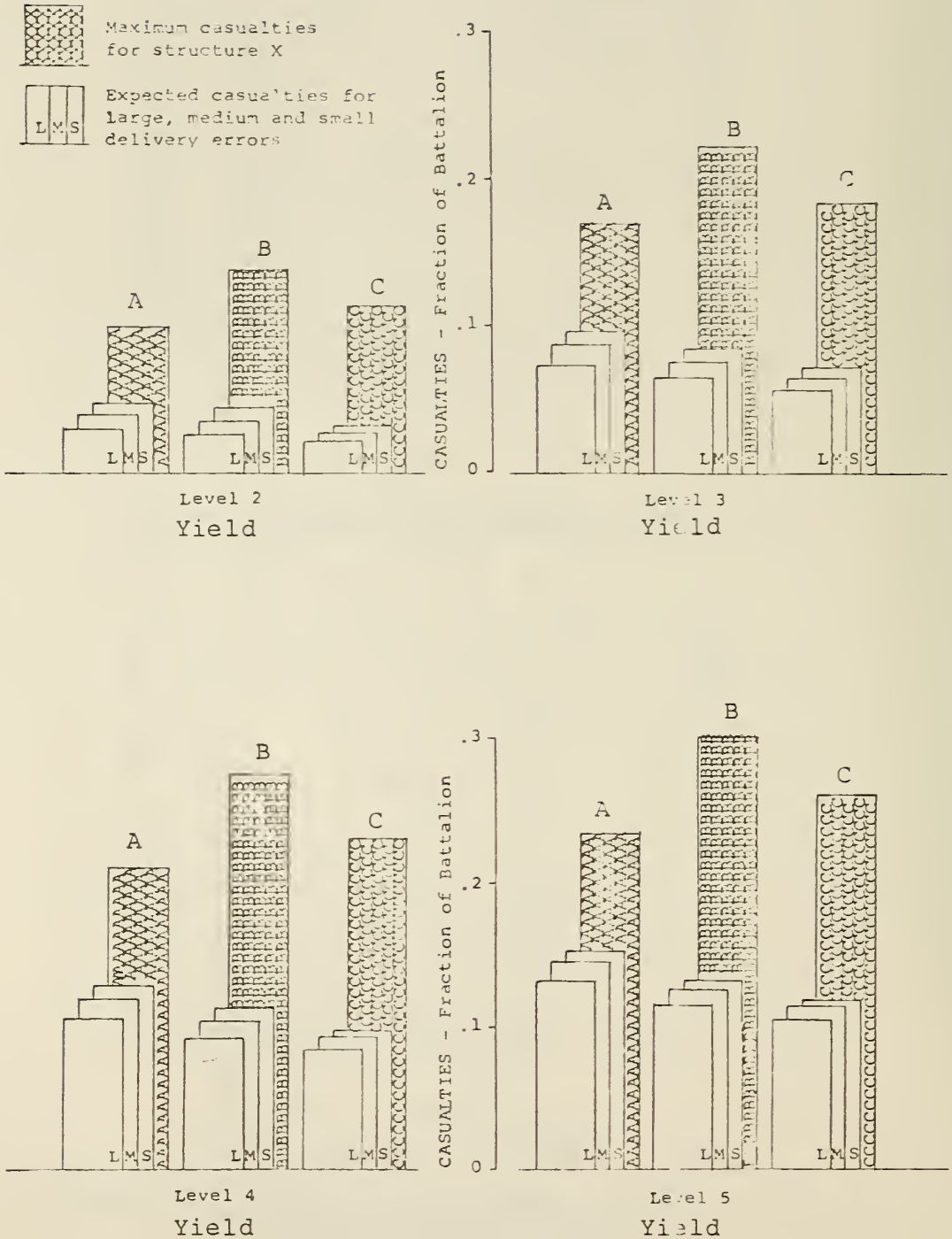


Figure III-89 - Casualties for Four Weapon Yields Using Pilot Study Deployments

fact that structures A & C had fewer maximum casualties than B reflects the capability for dispersion with more elements of the battalion. The casualty rates for alternative C were 10 to 14 percent higher than those of structure A. The differences between B and A were about three times as great. The relation of the expected casualties of the structures is not dependent on delivery accuracy or weapon yield. For each case, alternative A showed higher expected casualties than B or C. For the range of parameters used here, A showed 25-40 percent more casualties than C. Alternative B had casualty levels close to A for small yields and close to C for large yield weapons.

Between maximum and expected casualty levels, structure A reverses from the least to most vulnerable alternative. This fact is due to the positions of A's units relative to points of impact. Apparently, units of structure A, though smaller, were placed on more probable targets than were the units of either B or C. This case illustrates the basic dichotomy that when the blue forces are deployed to cover more terrain of military value, they become more vulnerable because red aim points are also based on terrain analysis.

Wargame Scenario - Because the pilot scenario was simple with well-determined terrain features, a more realistic scenario was sought. Taking advantage of previous work, the wargame scenario and output were used as input to the nuclear

vulnerability model. In the wargame, the structures were distinguished only as three or four company battalions. Therefore, only alternatives B and A were in direct correspondence to the wargame deployments. Alternative C was modeled as a variant of the four company structure but was too closely coupled with the deployments of alternative A to show much distinction.

Wargame deployments were taken in seven moments in response to an advancing red force. One moment was selected as representative of each of four players. That moment was after all the battalion units had landed but before the units had converged on the red forces. These deployments were input to the the model for two weapon yields. The results for yield Level 2 are shown in figure III-90 and for yield Level 5 in figure III-91. There was little relative change with blast size. For each player, the maximum and expected casualty levels were in the same relation between structures A and B. However, among the players, the relation between A and B was inconsistent. For two of the players, alternative A was more vulnerable while B was more vulnerable for the other two. Thus the wargame deployments failed to uphold the relations indicated by the pilot study.

Though the wargame was realistic, it was not best suited for this analysis. Deployments should be determined specifically for the structures in question and with respect to a

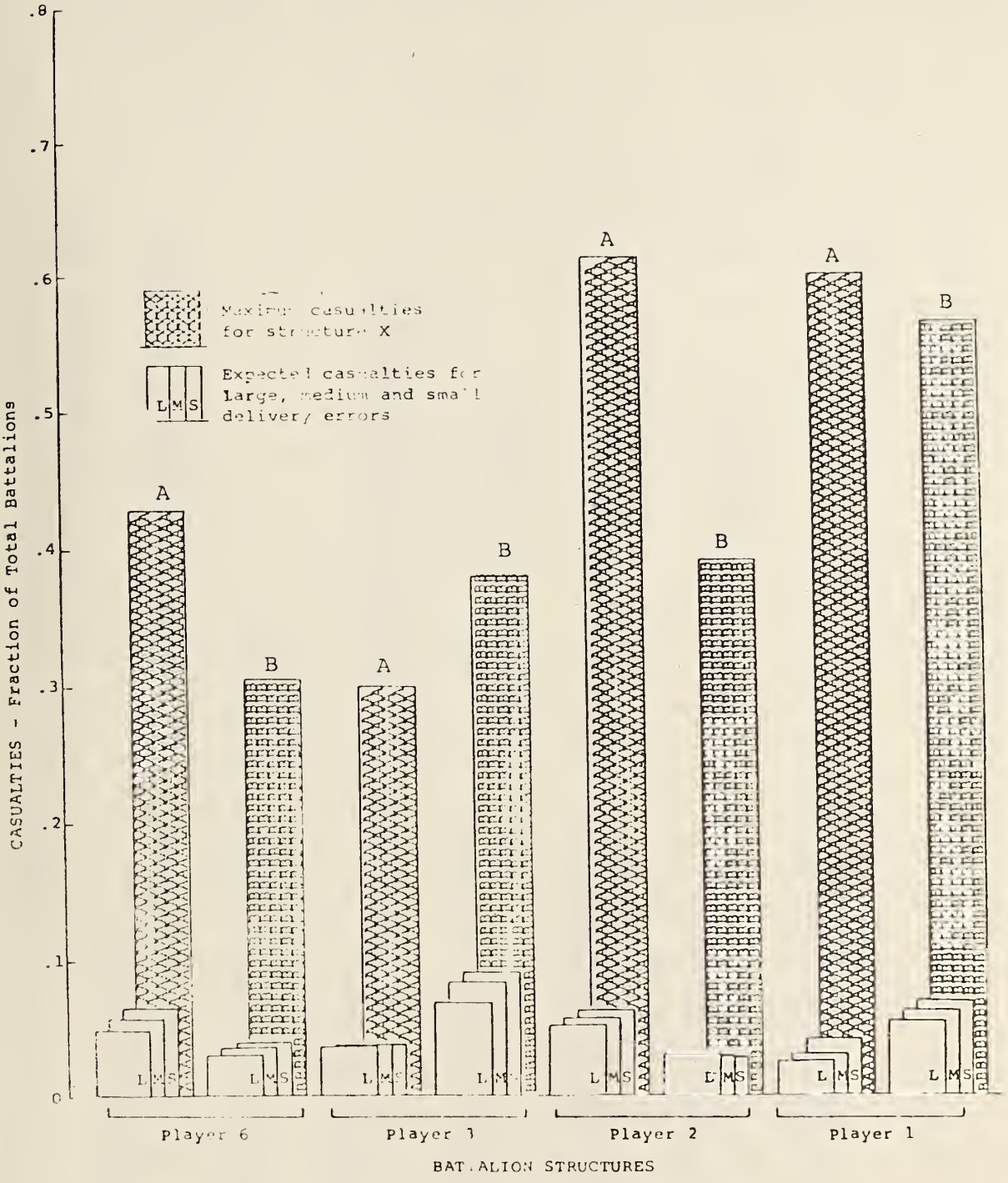


Figure III-90 - Casualties from Level 2 Yield Weapons Using Wargame Deployments

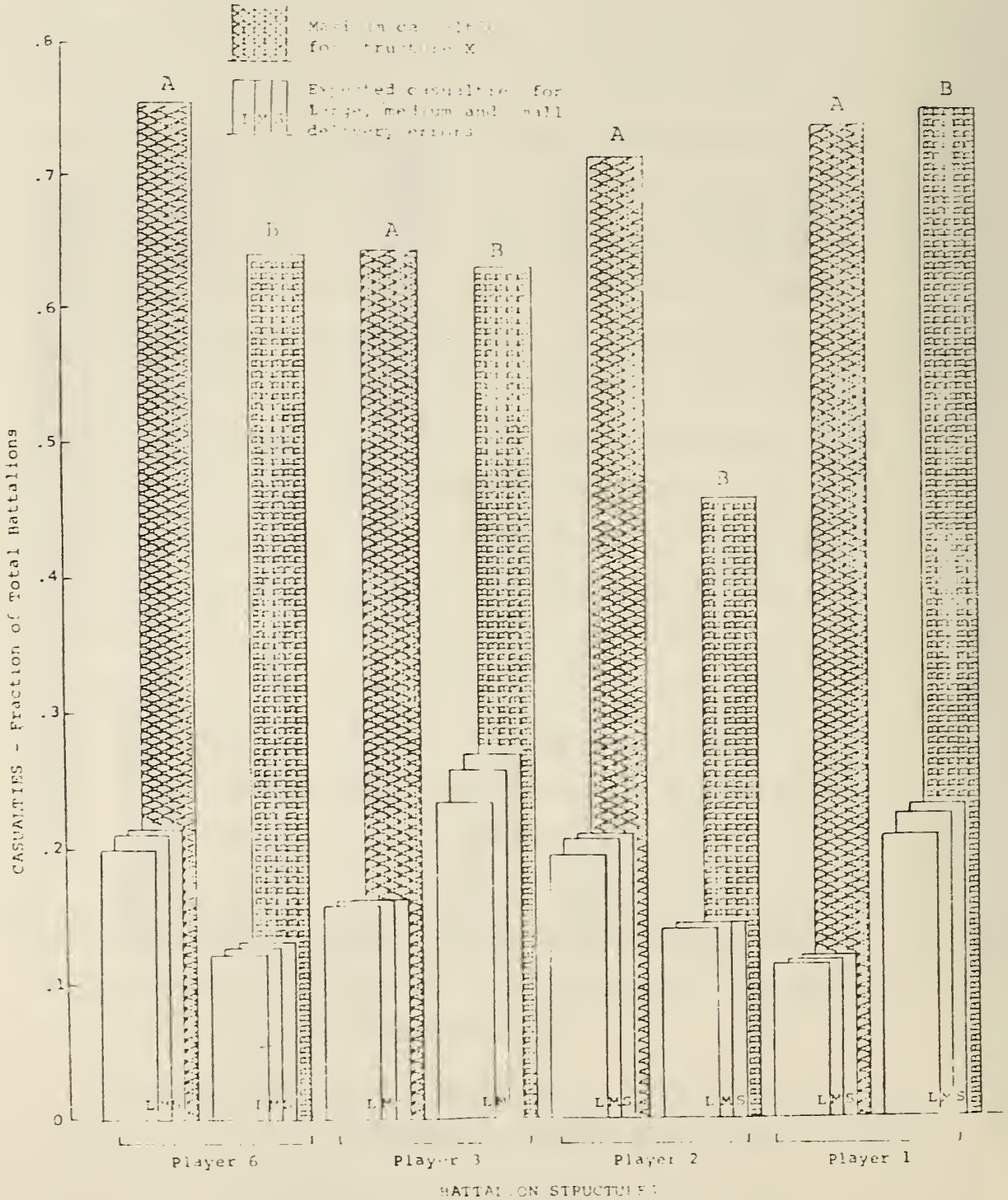


Figure III-91 - Casualties from Level 5 Field Weapons Using Wargame Deployments

nuclear threat. These shortfalls apparently made the wargame deployments inconclusive.

Third Phase - The third phase of this analysis made use of the wargame terrain but this time players blocking deployments were planned for the specific alternative battalion in view of a potential nuclear threat. This phase used the same methodology as the pilot study but with a more realistic scenario. The results are shown in figures III-92 and III-93. For the two players, maximum losses of alternative B were greater than those of A by 20-30 percent for low yield weapons and 8 to 15 percent for larger yields. The relative vulnerability of structure C is less certain. For one player, structure C was the best with A's expected losses up to 35 percent higher and B's expected losses up to 60 percent higher. For the other player, alternative C was the worst with losses up to 40 percent higher than A's.

- *Limitations of Analysis*

The simplified methodology used in this analysis does have some limitations. First, lethality was calculated in terms of personnel only. Supplies and equipment were not included because they would be similar for each structure. Furthermore, all personnel were regarded in an exposed posture. These two assumptions are unrealistic in the calculation of vulnerability in absolute terms. However, since all structures are kept on equal footing, the casualty figures are valid for

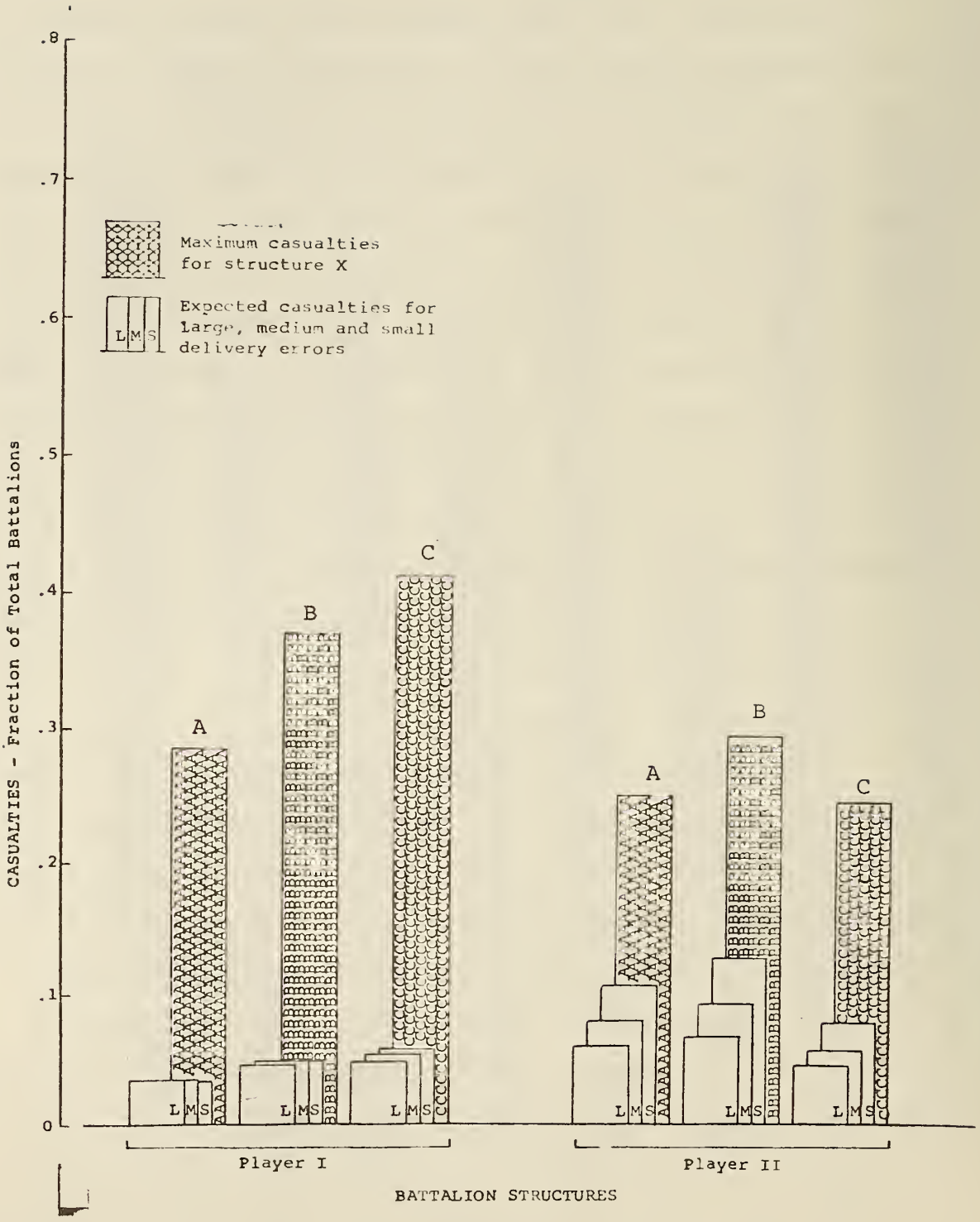


Figure III-92 - Casualties from Level 2 Yield Weapons Using Third Phase Deployments

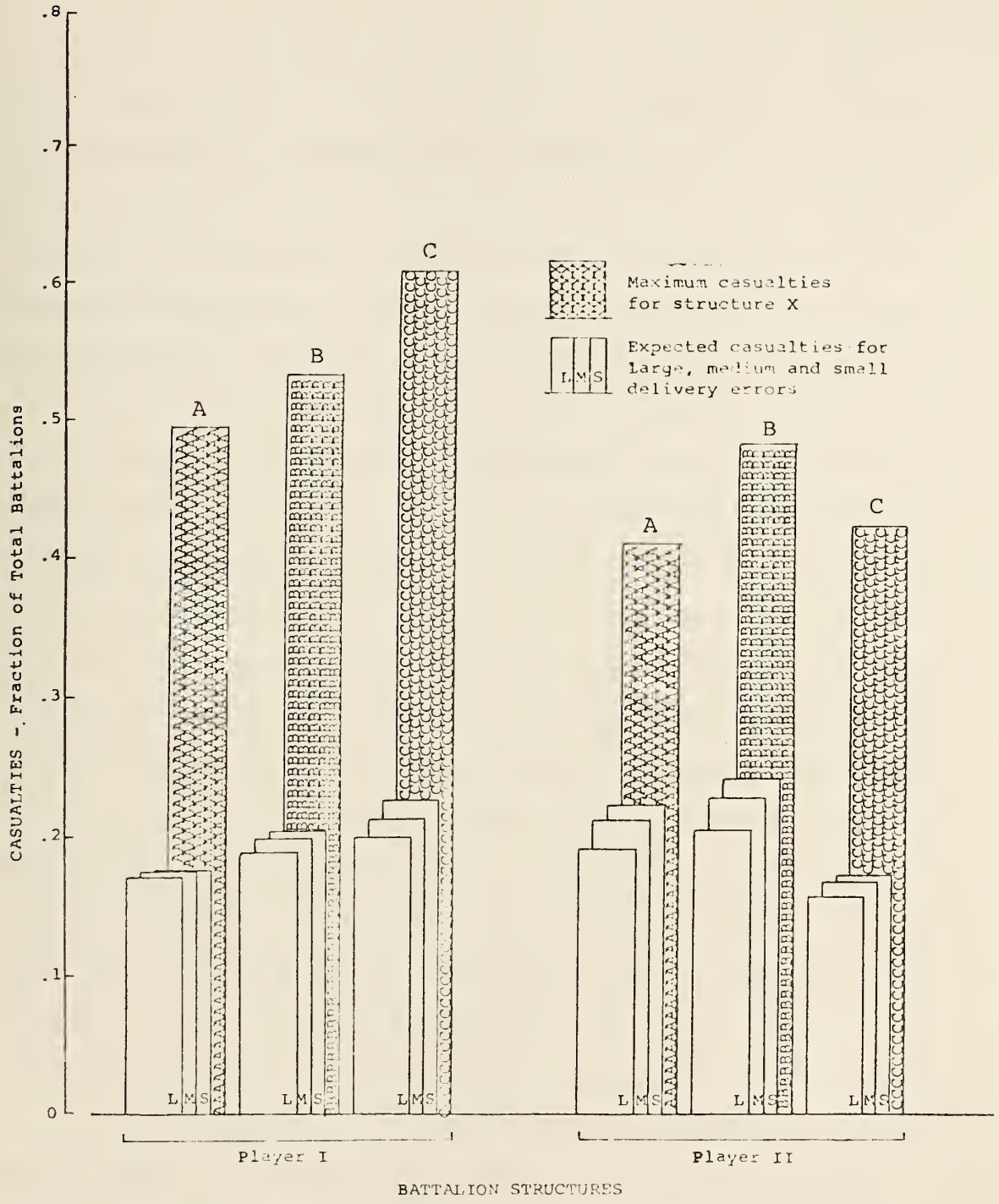


Figure III-93 - Casualties from Level 5 Yield Weapons Using Third Phase Deployments

comparison purposes. The same arguments defend the use of only one blast when, in fact, more than one blast would be possible. However, multiple blasts would cause casualty levels of all structures to converge toward 100 percent, which would obscure structure differences. Lastly, gross assumptions were made regarding enemy intelligence. Calculation of maximum casualty levels correspond to perfect red intelligence, that is detection and targeting the largest troop concentrations. Expected casualty calculations were based on no red intelligence other than map reconnaissance. Thus, the output of the model brackets the more realistic instance where red may have knowledge of a Rifle Company or other unit. However, to model intermediate levels of enemy intelligence would require more complex modeling and assumptions of detection capabilities that were not justified in this analysis.

In addition to these general limitations, the pilot study was too firmly structured to be realistic. This, of course, does not mean that the conclusions of the pilot study are not valid, but that they are predictable because of the limited variations of deployment. However, results are limited because the pilot was done with only one player.

Analysis with wargame deployments was restricted to structures A and B only. Furthermore, the four and three rifle company structures used by players of the wargame wer not identical to the battalion alternatives A and B. In light of the

resolution of the results, however, this limitation is probably not serious. An additional limitation was the lack of correspondence between any pair of moments in the dynamic play of the three and four rifle company structures. In an effort to make a fair evaluation, moments for comparison were subjectively chosen to represent the maximum dispersion of the units of each structure. Lastly, the players of the wargame were not asked to consider a nuclear threat. Although the possibility of nuclear weapons employment was not denied, results may have been significantly different had the possibility been considered by the players.

- *Observations*

Vulnerability versus Deployments - The pilot study and supporting theory indicate that a structure of fewer and larger units is more vulnerable if the units can be targeted and hit. They also indicate that structures with more units, capable of higher dispersion, are more vulnerable when the units are not specifically targeted but are located on more militarily valuable terrain. If the units are sufficiently mobile to be located away from valuable terrain, smaller units maintain the higher survivability.

Subsequent phases of this analysis show that these observations depend on deployment as well as battalion structure. In the wargames, the four rifle company battalion suffered many casualties because the companies were not dispersed. In the

third phase, alternative C showed inconsistent ranking because the units were dispersed by one player and not by the other.

The conclusion of this analyiss is that any vulnerability inherent in the battalion alternatives is easily over shadowed by the deployment decisions of the battalion commanding officer. It is not surprising that this effect can happen but that it does happen even in the face of acknowledged nuclear threat. One reason is the balance between a unit's effectiveness and its security: to be effective, a unit must accept vulnerability. Thus a structure may not be able to utilize its capability for dispersion without losing effectiveness.

Vulnerability versus Number of Maneuver Elements. One further factor equalizes the vulnerability of the alternative battalion structures. The locations of the most lethal blasts indicate that H&S Company is the most vulnerable target in terms of personnel casualties. This fact is not a result of structure as much as function. H&S Company requires nearby security forces and is usually accompanied by the Weapons Company for control reasons. The aggregation of these units presents an attractive target which is a common feature of all alternative structures. In short, against an informed enemy force, dispersion of rifle company assets does not reduce battalion vulnerability in light of the H&S Company - Weapons Company - security element aggregate. The higher maximum casualty figures of structure B relative to A is because the Weapons Company of B has fifty more men than that of A. The

figures are otherwise independent of the organization of Rifle Company assets and do not justify greater vulnerability of a three Rifle Company structure, in that casualties are actually greater in the H&S/Weapons Companies.

The same arguments hold for structure C. When the Mobile Assault Company is detached from Weapons Company, C falls between A and B in terms of Weapons Company personnel and maximum losses. With Weapons Company intact, C has highest maximum loss because it has the most men aggregated with H&S Company. Again, the Rifle Companies are not a factor in the ranking of maximum losses.

- *Summary*

Based on the results of the model's output, it can be concluded that a battalion with three larger rifle companies will fare less well on a nuclear battlefield than will one with four smaller companies. The exception to this appears to be the situation where, possibly because nuclear usage is not expected, the smaller companies are positioned in key terrain features. Since key terrain serves as aiming points for tactical nuclear weapons, a greater number of direct hits on friendly units would result with such a disposition of forces.

This factor suggests that mobility on the nuclear battlefield must be adequate to permit the control of key terrain without actually encamping on it. An organization with sufficient mobility to "get to the high ground on time" can

occupy positions of greater relative safety at some distance from the critical terrain target.

Of greater impact on battalion vulnerability, however, than the amount of dispersion among rifle companies is the lucrative target created by the almost mandatory aggregating of Headquarters and Service, and the Weapons Companies. The vulnerability to casualties that such a large personnel target represents is so great that the tactical disposition of maneuver elements can do little to compensate. This situation suggests another tenet for the nuclear battlefield: sufficient communications assets to allow the establishment of a "distributed command post." As a minimum, an alternate CP must be operated, at some distance from the main center of command.

Subject to the above discussion, it appears that the vulnerability of infantry battalions to the nuclear environment is less a matter of organizational structure than of tactics. The only structural preference that emerges is a slight favor for more, rather than fewer, maneuver elements; thus, a four company structure would be slightly less vulnerable by its nature, than would a three company battalion.

• *Conclusions*

- The modern infantry battalion should have greater numbers of smaller companies rather than fewer large companies.

- Mobility can reduce vulnerability on the nuclear battlefield.

- Distribution of the CP/Weapons Company/security element over two or more sites is the most significant contributor to infantry battalion nuclear survivability.

IIIE. COMMAND AND CONTROL (C^2)

Although the intangibility of many C^2 effects complicates the structure problem, certain aspects of command and control can be described. Traditional staff functioning can be measured by soliciting operational experiences and definition can be given to a priority of billet requirements for an infantry battalion. But the advent of new weapons systems alters traditional structuring, since introduction of automated systems designed to enhance C^2 often changes the traditional interactions between staff and command sections. Analysis of command and control for the infantry battalion of the 1980's primarily centers on an attempt to relate the traditional hierarchies to the Marine Tactical Command and Control System (MTACCS).

Variations of organizational design in a 900-man structure permit an exhaustive number of battalion configurations with differing command and control relationships. The method used for the examination of command and control was an attempt to ignore the differences between C^2 configurations and focus, instead, on the functions themselves. Once this was done, the study team would then ensure that each candidate structure complied with the C^2 findings developed through analysis.

A path for examination of command and control was set as follows: (1) determine from operational experience C contributions of past structures, (2) attempt to define C^2

requirements for the 1980's, and (3) assess the advantages and disadvantages of MTACCS.

It was reasonable to anticipate that organizational structure would require adjustment to exploit tactical and technological innovations, while minimizing vulnerability. The infantry battalion commander must command and control his unit to apply new firepower systems efficiently and with precision, be capable of managing improving target acquisition, and be capable of maneuvering and massing supporting fires. Control of terrain would be accomplished through coordination of widely dispersed, small units in depth and laterally. Furthermore, a need for maneuver warfare places a high premium on tactical mobility, maneuver, target acquisition, and firepower, all of which demand effective C^2.

- *Human Factors Analysis of Infantry Battalion Officer Billets*

The initial area reviewed was the requirement for command and control personnel within a battalion. There are numerous studies and analyses which describe the need for officer training, experience, depth, and other related requirements. Within the fairly brief time available, however, none were found which specifically addressed the difficult question of whether or not a particular billet actually demanded a commissioned officer rather than a senior noncommissioned officer.

In reviewing Marine infantry battalion officer billets (with the potential result of recommending commissioned officer strength reductions) efforts were made to avoid haphazard or unreasoned judgements. While intuitive assessments may be adequate in certain billets (for instance, experience might be sufficient to determine that the Assistant 81mm Mortar Platoon Commander's billet is probably less vital than a Company Commander's) a more systematic overall approach was considered necessary. The following five step method was used in this analysis to form a response to the question, "Which infantry battalion officer billets could be reduced in conjunction with an enlisted strength reduction?"

1. Identify several characteristics which by pattern or tradition are predominantly found among officer personnel.

2. Determine means for measurement of each officer characteristic.

3. Examine each officer position in the infantry battalion one at a time. For every billet, measure the degree each officer characteristic (step 1) is demonstrated.

4. Compute an "Officer Characteristics Score" (OCS) for each infantry officer billet.

5. Using the OCS, rank each billet against the others within quartiles to aid in estimating the relative need for a commissioned officer in each. The general conclusion was

that officer reductions, if necessary, should be made by eliminating those billets with the lowest relative need (as indicated by quartile and OCS) for a commissioned officer.

The results of this analysis are proposed as aids in making officer reduction judgements.

• *Officer Characteristics*

Review of several sources resulted in the compilation of a list of characteristics which, when measured, were considered indicative of knowledge, skills, and thought processes demonstrated by commissioned officers. The higher the score in these characteristics for each billet, the stronger was the indication that such a position should be filled by a commissioned officer. The characteristics evaluated were:

1. Decisionmaking - the requirement within each billet for unique, non-repetitive decisions. This trait was measured on a binary scale, assigning a value of zero to each billet requiring predominantly trivial or repetitive decisionmaking (subjective evaluation).

2. Situation Perception - the need to recognize a current situation and almost immediately be aware of possible impacts. For example, a patrol leader demonstrates this characteristic when he opts to detour around, rather than walk between, two commanding elevations. This trait is measured on a scale of 1 to 5 and is based on the frequency each billet would require such awareness (Scale: 5-almost always, 4-often, 3-half the time, 2-sometimes, 1-almost never).

3. Battlefield Planning - making rapid decisions to position/commit resources in anticipation of an urgent need. A company commander's decision to assign Hill 320 as a platoon, vice company, objective is an example of such a decision (rated on a scale from 1 to 5 based on the frequency with which each billet requires this trait).

4. Conceptualization - ability to mentally perceive a "big picture" based on repeated clues/experiences (measured on a 1 to 5 scale based on frequency).

5. Communication - receiving and projecting information both upward and downward. Measured through review of typical message traffic sent/received by infantry battalion billet holders in combat. Command Chronologies from the USMC Archives formed the basis for examination. Vietnam data was used.

6. Analysis - through study, recognizing the various elements of an entity. An intelligence officer uses this characteristic to identify specific enemy tactics and units by study of an overall pattern (rated from 1 to 5).

7. Synthesis - ability to combine elements to form a new entity; creative and imaginative application of resources (measured on a scale from 1 to 5).

8. Training - if the duties of the billet are best served by a broad training preparation, such as TBS, a score of 1 was assigned. If training needs are technical, a score of 0 resulted.

9. Span of Command

a. Resources - the number of major end items of equipment the billet incumbent manages (an ordinal number).

b. Personnel - the number of persons under the direct sphere of influence of the incumbent (an ordinal number).

10. Supporting Arms Span of Influence - an ordinal value corresponding to the number of weapons systems normally available for support at the request and direction of the billet occupant. The systems considered were limited to: artillery, naval gunfire, close air support, tanks, mortars (81mm), mortars (60mm), anti-armor (DRAGON), and anti-armor (TOW). Maximum score of 8 was possible.

11. Requirement for Continuity - the urgency with which billet holders must be replaced should they become ineffective for any reason. A scale from 1 to 5 was used for this qualitative assessment. Billets requiring immediate replacement received highest scores.

A Delphi technique was used to query a set of respondents. The respondents graded each billet based on the criteria above. Data produced was normalized to produce "scores" for each of the 27 billet designations currently listed on the infantry battalion table of organization. The next step in analysis required grouping the listed officer characteristics into four categories. Figure III-94 shows the results of the

ordinal ranking that was determined by averaging composite scores from each category.

BILLET	RANKING	RANKING INDEX	CATEGORY RANKING I	II	III	IV
BN CMDR	1	2.00	1	5	1	1
RIFLE CO CMDR	2	3.25	2	5	3	3
S-3	3	4.75	3	5	10	1
WPNS CO CMDR	3	4.75	5	5	5	4
WPNS PLT CMDR	5	7.12	7	5	9	7.5
RIFLE PLT CMDR	6	7.38	9	5	12	7.5
S-4	7	10.88	8	5	16	19.5
81 PLT CMDR	8	11.25	12	17.5	8	7.5
DRAGON PLT CMDR	9	12.50	14	17.5	11	7.5
BN XO	11	13.75	4	5	22.5	19.5
COMM O	11	13.75	11	17.5	6	19.5
RIFLE XO	11	13.75	6	5	22.5	19.5
SUPP O	13	14.50	13	17.5	2	19.5
S-2	14	15.50	10	17.5	16	19.5
LN O	15	15.88	15	17.5	22.5	7.5
NBC O	16	16.00	17	17.5	15	19.5
H & S CO CMDR	16	16.00	[illegible]	17.5	4	19.5
AIR OF	18	16.12	18	17.5	22.5	7.5
MTO	19	16.25	21	17.5	7	19.5
FAC	20	16.50	23	17.5	18	7.5
S-1	21	17.50	19	17.5	14	19.5
STA PLT CMDR	22	18.25	23	17.5	13	19.5
WPNS CO XO	23	18.38	14	17.5	22.5	19.5
S-3A	24	19.12	17	17.5	22.5	19.5
H & S CO XO	25	21.38	26	17.5	22.5	19.5
81 ASS't PLT CMDR	25	21.38	26	17.5	22.5	19.5
S-1A	27	23.75	[illegible]	27	22.5	19.5

Category I - Situation Perception, Situation Understanding, Battlefield Planning, Synthesis, Conceptualization, Analysis, Requirement for Continuity

Category II - Decisionmaking, Training

Category III - Span of Command - Resources, Personnel

Category IV - Supporting Arms Span of Influence

Figure III-94 - Assessment of Human Factors of Infantry Battalion Officer Billets

- *Message Flow Analysis Within an Infantry Battalion*

By examining the message flow typical within a battalion, critical nodes of staff functioning and chokepoints could be defined. Correlating this information with the

results of human factors analysis produced a refined preference ordering for officer billets. If officer reductions are mandated in a reduced infantry battalion size, then these decision aids should help identify the "least required" billets. Research at the Marine Corps Historical Center, Washington Navy Yard produced a series of combat unit journals that reflected message flow within a battalion. The journals were used for a table-top command post exercise (CPX) to produce statistical data. Sixteen battalions employed in combat operations in Southeast Asia were evaluated. None of the battalions evaluated were involved in amphibious operations but only periods of combat operations that included intense, sustained contact with enemy forces were selected so as to maximize communications dependence. Journal entries were compiled and given to three "CPX battalion staffs" who processed each message both internally and externally to the battalion. Data reduction included normalizing the message flow to present a composite matrix that showed percentage of messages to key nodes within the battalion's structure. Figure III-95 shows the results. Inspection of the results indicates, for example, that 25.4% of S-3 messages were distributed to the FSCC and 35.6% to the rifle companies.

- *Impact of MTACCS*

Previously mentioned, the 1980's will introduce a series of systems that affect the infantry battalion. The Marine Tactical Command and Control System is a conceptual

FROM \ TO	EXT	CO	S-1	S-2	S-3	S-4	FSCC	RIF Co	H & S Co
EXT		.015	.463	.159	.359	.004			
CO					1.000				
S-1	.207							.707	.086
S-2	.154	.014	.035		.105	.021	.028	.490	.154
S-3	.096	.023	.059	.108		.091	.254	.356	.014
S-4	.100	.013		.074	.262	.038	.181	.289	.043
FSCC					1.000				
RIF Co			.054	.110	.774	.051	.012		
H & S Co					.421			.579	

Figure III-95 - Message Flow Summary Within An Infantry Battalion

association of C^2 systems to support tactical operations. Quoting from the MTACCS Master Plan, it "consists of eight functionally oriented tactical and training systems, using, where feasible, common equipment, operational procedures, data bases, and design philosophy, and, where appropriate, interoperating through a common communications system." The eight systems are listed as follows with expected implementation dates:

- Position Location Reporting System (PLRS) - 1982.
- Marine Air-Ground Intelligence System (MAGIS) - 1983 (final component of four components on-line).
- Tactical Air Operations Central - 1985 (TAOC-85) - 1985.
- Tactical Combat Operations System (TCO) - 1986.
- Marine Integrated Fire and Air Support System (MIFASS) - 1986.

- Marine Integrated Personnel System (MIPS) - 1986.

- Marine Integrated Logistics System (MILOGS) - 1988.

- Tactical Warfare Simulation, Evaluation, and Analysis System (TWSEAS) - in operation.

Succinctly, what then are the perceived and tangible effects of MTACCS upon the infantry battalion? As a departure point, figure III-96 is a matrix that shows the ground elements that will be nodes of operations for MTACCS subsystems. As illustrated, PLRS will be operationally deployed down to, and below, battalion level. TCO, MIFASS, MIPS, and MIFASS are discussed below in some detail; the effects of MIPS and MILOGS must be generalized since these two systems are still in conceptual stages of development.

	PLRS	MAGIS	TAOC-85	TCO	MIFASS	MIPS	MILOGS	TWSEAS
DIVISION	X	X		X	X	X	X	X
REGIMENT	X			X	X	X	X	
BATTALION	X			X	X	X	X	
COMPANY	X							
PLATOON	X							

Figure III-96 - MTACCS System Impact at Levels of Command

Command and control enhancements and/or degradations created by MTACCS can be categorized into two functional areas - operations and maintenance. The credentials of MTACCS suggest greatly improved support of tactical operations.

Commanders will receive real-time information to improve the quality and timeliness of decisionmaking. Technologically, there will be an influx of highly sophisticated computers, data storage, and display devices. This increase in operational effectiveness will require changes in manpower requirements (new skills and skill levels), increased training, and, possibly, changes in organizational design. Maintenance requirements should not be stifling at the infantry battalion level as long as external maintenance support (3d echelon and above), Operational Ready Float (ORF), etc. remains available and responsive. Correlating external maintenance support to the assumptions made for an infantry battalion's increased mobility and dispersion of maneuver elements creates a coincidental demand for greater coordination.

As a "stand-alone" system, PLRS will have a direct impact on the infantry battalion. The battalion commander will be able to control unit movement better plus perform enhanced fire support coordination. These operational advatages weighted against degradations indicate PLRS to be a highly acceptable system. The indirect degradations to C^2 do require mentioning, though. *On-the-job training will be needed for user-unit personnel* equipped with PLRS. Secondly, the present-day *training requirements of land navigation and map reading must be continued.* Even though redundancy of PLRS equipment exists, there can be operational *problems if catastrophic failure of*

the PLRS master unit occurs. A six minute turn-up time is required for the alternate master unit. A gap of six minutes that could be encountered with PLRS usage would be detrimental upon a battlefield characterized by short, intense conflicts. Obviously, PLRS is most vulnerable to equipment failure during moments of intense conflict. Therefore, personnel within user units will require positive knowledge of "what to do" when equipments fail. Additionally, not all maneuver elements are necessarily equipped with PLRS devices. The battalion commander will best maintain effective command and control through *well-trained personnel.* Maintenance requirements appear to be centered upon coordination between user units and external support agencies. For organizational maintenance, the battalion commander is faced with *an additional mission-oriented training requirement.* Concern must be given to *increasing the battalion's inventory* of equipments. PLRS will have a negligible effect upon unit mobility, but it is a contributor to an *ever-increasing "load" of the battalion.*

Even though PLRS is a "stand-alone" system, its maximum effectiveness will be achieved through interface of location data with other MTACCS systems. Position location information (PLI) will be fed to MTASS, TAOC-85, and TCO. There is a direct effect upon C^2 from PLI "management."

Experience with Marine Tactical Data Systems (MTDS) suggests a potential problem associated with MTACCS introduction.

"Track management" within MTDS is accomplished by *highly trained personnel* capable of correlating sensor information from multiple sensor sources. That is, if a "track" of an air target is reported in different relative positions to the central coordinator, steps must be followed to resolve the conflicting target geographic reports. It seems likely that similar conflicts will occur when PLRS is introduced into field units. Although PLI management is not foreseen as an insurmountable problem, it will still require extra means of coordination. Applying this situation to the infantry battalion commander, it is probable that coordination requirements will filter down to his level. Therefore, a comand and control requirement associated with MTACCS will best be overcome with *highly trained personnel* using PLRS equipments.

MIFASS and TCO enhance the total operational effectiveness of a MAGTF, but the degree of improvement for the infantry battalion commander is uncertain. In a pure C^2 vein, MIFASS appears to contribute more at the battalion level than does TCO. MIFASS will improve the utilization of supporting arms coordination. The infantry battalion FASC will clear fire missions for execution within the battalion's zone of action using automated systems. *MIFASS increases the battalion's staff by six personnel* although MTACCS shows an overall force reduction in required personnel. TCO will increase tactical efficiency through automated equipments for the MAGTF. There

is some question as to acceptability of TCO at the infantry battalion level based on perceptions that the systems straps the battalion commander to the COC and makes him a manager more than a combat leader. TCO obviously enhances C^2 at Division/Regimental levels of command, but the battalion enhancement is less evident. TCO positively reduces radio nets for the infantry battalion from nine to five; its stated savings in personnel required for COC operation may or may not be realistic when 24 hour operations are analyzed; and TCO increases the battalion's T/E considerably (53% more weight and 28% more cube for COC equipment). Figures III-97, III-98, and III-99 provide comparisons that illustrate some of the effects of MTACCS.

To summarize, the MTACCS subsystems will provide automation capable of enhancing the infantry battalion commander's efficient, real-time decisionmaking ability. The acceptance of all of the subsystems is based on subjective analysis; MIPS and MILOGS can not be analyzed beyond generalities due to lack of definition. *Command and control will be enhanced tactically; yet coordination of maintenance requirements, additional equipment density, probable manpower increases, and increased training requirements are obvious concomitant degradations.* Total MTACCS acceptability at the infantry battalion level should be reexamined as each subsystem becomes better defined. At present, review of the advantages and drawbacks considered

SKILL	SKILLS NEW	SKILLS DELETED	SKILL LEVELS	TRAINING
0121[1]	X			OJT Required
0151[1]	X			OJT Required
0231[1]	X			Formal School Required
0239[1]	X			Formal School Required
0369[1]	X		Increases to GT 100+	Formal School Required
0441[1]	X			OJT Required
0848[2]		X		
1811[3]	X		Increases to GT 100+	OJT Required
59XX[4]	X			Formal School Required
7041[1]	X			Formal School Required
XX11[2]	X			Formal School Required
XX21[2]	X			Formal School Required
XX31[2]	X			Formal School Required
XX91[2]	X			Formal School Required

[1]Secondary MOS acquired through a 5 week formal school training course

[2]For accounting purposes refers only to MIFASS operators

[3]TCO, MIPS, MILOGS operators training

[4]MTACCS maintenance repairman

Figure III-97 - MTACCS Impact upon Skills and Skill Level

BN COC RADIO NETS

BEFORE TCO	AFTER TCO
1. DIV RECON	1. DIV INTEL
2. DIV ALERT/ BROADCAST	2. DIV RECON
3. DIV DAMAGE CONTROL	3. INF REGT TAC
4. DIV TAO	4. BN TAC 1
5. REGT TAC	5. BN TAC 2
6. REGT CMD	
7. REGT INTEL	
8. BN TAC 1	
9. BN TAC 2	

Figure III-98 - Comparison of Battalion COC Radio Nets Required Before and After TCO

MARINE INFANTRY BATTALION COC COMPLEX

Commodity	Baseline Weight	Baseline Cubic Foot	TCO System Weight	TCO System Cubic Foot	Difference Weight	Difference Cubic Foot
Communications	1212	165	710	52	-1102	-113
TCO Equipment	--	--	499	13	+499	+13
Furnishings	1307	130	726	65	-581	-65
Consumables/ Reference Material	250	20	250	20	0	0
SUB-TOTAL	3369	315	2185	150	-1184	-165
Shelters	455	19	3650	278	+3195	+259
TOTAL	3824	334	5835	428	+2011	+94

Figure III-99 - Comparison of pre-TCO and TCO COC Complexes

in this study indicates that the proper configuration of MTACCS for the infantry rests at some as yet undefined point on a continuum between PLRS and TCO. Although the exact configuration can't be described as yet, it appears that the drawbacks and advantages are such that a recommendation could be phrased as suggested by figure III-100: "PLRS, yes; TCO, no."

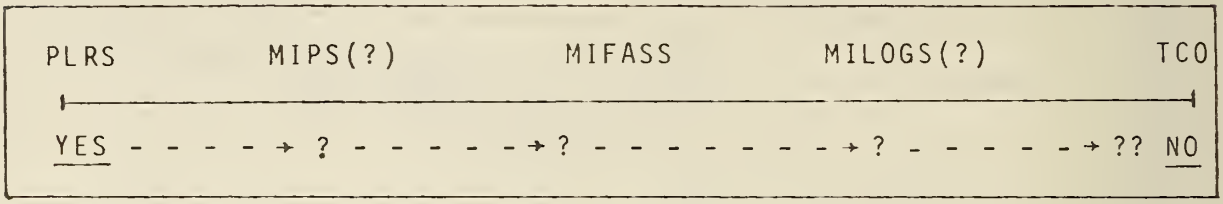


Figure III-100 - How much MTACCS is Suitable for the Infantry Battalion?

IIIF. LOGISTICS

Introduction

Changes in the infantry battalion's structure will create individual logistical needs for each derivative that is developed. The detailed logistical analysis that could be completed for each structure, however, should not be attempted for every variation of a 900-man battalion. For the purposes of analysis, a general logistics evaluation of a set of similar battalion structures will assist in developing the subset of preferred, or candidate, structures. Follow-on analysis that will measure logistical supportability is required for the final candidate structure(s).

The methodology described above was accepted as practical after the creation of the extensive list of possible 900-man structures. The general appraisal would include effects upon mobility precipitated by structural change based on the conclusion that mobility for an infantry battalion is a vital characteristic. Examination of new equipments and the present table of equipment would be done to measure the effects of various configurations. A follow-on analysis will be completed in greater detail upon review by Fleet Marine Forces of this interim report.

Initially, little differentiation of a macro-level for logistics supportability can be made among varying battalion structures of 900-man strength. The same unit of issue for individual items, a similar basic allowance, and similar resupply requirements occur for these variations. On the other

hand, if personnel strength remains relatively constant and types of equipment organic to the battalion change, there will be differences. Additionally, consideration of the organizational design will define thy structural variations that can affect logistics "flow" of supportability. That is, if one equates decision points within the hierarchy of an organization as logistics nodes, the "flow" of supportability could be measured to indicate effects upon logistical supportability for a particular structure. This technique approaches the micro-level of analysis and will be included in the follow-on analysis of the recommended candidate structure(s).

Increased mobility and ability to maneuver are desired characteristics of the infantry battalion basing these observations on analysis of battalion structure versus the "threat of the 1980's." The future battlefield will feature rapid engagements and violent conflict. Small-sized units must move rapidly and be capable of dispersing over a large area of operations. Logistical supportability will be more difficult for supply and resupply and for evacuation of casualties. It is recognized that tempo of operations and tactical employment influence logistical considerations. However, structural iterations create the immediate need to define the logistical requirements resulting from these changes. The logistical effects upon mobility must be measured first by changes in the organization's structure.

Mobility

Strategic and tactical mobility can be appraised in two different ways since they differ in their basic meaning. Strategic mobility, thycapability to deploy and sustain military forces worldwide in support of national strategy, can be assessed by stating that structural change should have little impact on logistical supportability of a battalion of *pre-established* size. If assets are available to lift Battalion A (with 900 men and their equipment), those same assets should also be capable of lifting Battalion B (with 900 men and their equipment). However, strategic mobility will be affected if equipment densities are varied. That is, the inclusion of APC's in one structure and not another has an intuitive impact upon strategic mobility. Lift assets are different in this case.

Logistical implications for tactical mobility are more complex. As the ability to maneuver rapidly upon the battlefield increases, it can be intuitively stated that supply/resupply of maneuver elements will become more demanding. However, to judge the logistical impact for a more mobile infantry battalion requires definition of the sources of increased tactical mobility and associated tradeoffs. If tactical mobility is defined as a function of foot mobility, vehicular mobility, or air mobility, logistical implications are more self-evident. Briefly, the foot mobile battalion

gains access to marginal terrain denied to vehicular mounted troops. What is sacrificed is the capability to carry heavy firepower assets to meet and defeat a postulated mechanized threat and an ability to *maneuver rapidly* over extended distances to meet the threat and maintain engagements. Based on this, there would appear to be an apparent mix requirement of vehicular and air assets required to compensate for maneuver obstacles. The addition of vehicular assets increases the capability to supply and resupply maneuver elements and evacuate casualties in a more timely manner. Terrain accessibility becomes more limited, though. Under this circumstance, unless the vehicular asset contributes a complementary firepower attribute, it has a minor contribution to combat power. Air assets may be treated similarly. Speed of delivery and accessibility to terrain increases when air assets can be used in lieu of ground vehicles which suggests a strong advantage to the infantry battalion that is completely air mobile. Figure III-1 is a subjective evaluation measuring the attributes of derived mobility for an infantry battalion.

Based upon these evaluations, air mobility appears to provide the greatest enhancements in the four categories listed. To evaluate the requirements demanded to achieve air mobility, a brief analysis was conducted of helicopter lift requirements.

Helicopter Lift Requirements

Helicopter mobility requirements for alternative battalion structures were examined for two cases. The first case assumed

TACTICAL MOBILITY PROVIDED BY...	ACCESSIBILITY TO TERRAIN	SPEED OF ACTION/REACTION	FIREPOWER VS THREAT	VULNERABILITY TO THREAT
Foot Mobility	Excellent	Marginal	Marginal	Highest
Vehicular Mobility	Marginal	Good	Exceilent	Higher
Air Mobility	Excellent	Excellent	Excellent	High

Figure III-101 - Mobility Evaluations for an Infantry Battalion

an administrative move of the battalion without attachments or detachments. Since differences among the structures are of most interest, a simplification was made that stated that all elements of H&S Company except for the company headquarters were the same for all structures. These elements would then have the same lift requirements and were excluded from the calculations. Figure III-102 shows the excluded elements of H&S Company.

ELEMENT	NO. OF PERSONNEL
Battalion Headquarters	50
Communications Platoon	64
Service Platoon	47
STA Platoon	9
Total H&S Company	170

Figure III-102 - H&S Company Elements Common Among Battalion Alternatives

The second case considered battalion structures augmented to form an initial lift by a notional BLT. The forces involved in the initial lift included all personnel and equipment of the Rifle Companies and Weapons Company. Only essential elements

of H&S Company which were excluded in the first case were included as shown in figure III-103.

ELEMENT	NO. OF PERSONNEL
Battalion Headquarters	29
Communications Platoon	48
Service Platoon	5
STA Platoon	9
Total H&S Company	92

Figure III-103 - Common H&S Company Elements Included in Initial Assault

Attachments to the notional BLT are listed in figure III-104. The notional BLT was derived from a completed study: Tactical Mobility for the Amphibious Assault and SOA for the Mid-Range Period (1984-1994) (S). These attachments are kept common among the battalion alternatives in the second case.

ATTACHMENT	NO. OF PERSONNEL
Corpsmen	67
Engineers	30
FAAD	40
Artillery	26
Helicopter Support	8
Naval Gun Fire	7
Total	178
TOW Squads (5 men plus equipment)	1 squads

Figure III-104 - Attachments to Battalion Landing Team

Certain assumptions were made for the loading of helicopters. The maximum loads for the CH-46 and CH-53D helicopters were 4,250 and 12,250 pounds, respectively. These limits were based on sea level, 90°F. take-off and a mid-point landing at 3000 feet, 91.5°F. Personnel weights were assumed to average 240 pounds per Marine including his assigned weapons, ammunition, and supplies. The exception to this assumption was with regard to TOW. The ground-mounted TOW weapon system and ammunition was considered separately at 174 pounds per launcher and 54 pounds per round with 16 rounds per launcher. Under the assumptions, the basic load of the CH-46 was taken to be 16 Marines at 3,840 pounds or one TOW squad of five Marines, two launchers, and 32 rounds at 3,276 pounds.

Analysis was conducted for three different structures. Structure 1 was a four-rifle company infantry battalion with H&S and Weapons Companies. The 11-man rifle squad is resident within Structure 1's rifle companies. Structure 2 is a three-rifle company infantry battalion with a Weapons Company and H&S Company. A 13-man rifle squad is used. This structure is modelled on the "I" series T/O with some modifications. Structure 3 is a 3-rifle company structure with a Weapons Company and H&S Company. The Weapons Company includes a maneuver element (a rifle company minus), TOW assets and STINGER teams for an air defense capability. Rifle squads have 11 Marines in each squad.

Figure III-105 shows a comparison of the three battalion alternatives in the first helicopter lift case. From the total number of personnel, those spaces common to each H&S Company are subtracted. Next, the personnel in the TOW squads are subtracted from Structure 3. The remaining Marines can be loaded in groups of 16 men onto CH-46 helicopters. (Note: The number of loads is always rounded up.) The number of loads of TOW (at one per squad) is added to Structure 3. Comparing the number of CH-46 loads for the administrative move shows the alternative structures to be within one or two sorties of each other. The assets common to each H&S Company would add additional sorties.

	Battalion Structure		
	1	2	3
Battalion Total	916	902	897
Common H&S Units	-170	-170	-170
			727
TOW Personnel			- 20
	746	732	707
Loads at 16 men/load	47	46	45
TOW at 5 men/load			4
Total CH-46 loads	47	46	49

Figure III-105 - Relative Helicopter Loading Requirements for Battalion Alternatives

Analysis of the second case was completed in similar fashion. Figure III-106 provides the comparisons between structures. One notable assumption here is that the four TOW squads of Structure 3 are included in the total of eight squads allowed every BLT. This brings the count of CH-46 sorties for structure 3 down below the others. Alternative structures are still within

one or two loads of the others. Adding these four loads to Structure 3, making the attached forces equal in each case, does not significantly change the spread of load requirements among the alternative structures.

	Battalion Structure 1	2	3
Battalion Total	916	902	897
H&S Company Adjustments[1]	- 88	- 88	- 88
			809
TOW Personnel			- 20
	828	814	789
Attachments	+178	+178	+178
	1006	992	967
Loads at 16 men/load	63	62	61
TOW at 5 men/load[2]	8	8	8
TOTAL CH-46 loads[3]	71	70	69

[1]H&S Company adjustments reflect the initial lift of only 82 of the 170 men in the common H&S Company units.
[2]All BLTs are given 8 TOW squads. In structure 3, 4 squads are organic and 4 are attached.
[3]All structures also require two CH-53D flights for the initial lift.

Figure III-106 - Relative Helicopter Loading Requirements for Notional BLT's

Major End Items of Equipment

Some logistical determinations can be developed by examining the current N-series Tables of Equipment (T/E). By selecting major end items of equipment from the T/E, three categories of major end items appear in some density that that could be affected by structure organization. The communications-electronics and motor transport items are focused upon since

this is where the density of major end items exist. Ordnance items are expected to fluctuate unilaterally within proposed structures of 900-Marines. If a three rifle company versus a four rifle company structure argument is raised, figure III-107 represents the major end items that would presently be available to either battalion for distribution. The addition of a

[illegible] NO.	END ITEM	1174	1173	1172	1171
A1415	Radar Set AN/PPS-15	-	-	8	8
A1815	Radio Set AN/GRC-160	-	-	11	11
A2020	Radio Set AN/PRC-47	-	-	5	5
A2040	Radio Set AN/PRC-75A	-	-	5	5
A2050	Radio Set AN/PRC-77	-	-	58	58
A2390	Signal Lamp Equipment	-	-	10	10
A2635	Telephone Set TA-838	-	-	18	18
D0840	Trailer 1/4 T	-	-	22	22
D0890	Ambulance	-	-	1	1
D1015	Truck, 1 1/4 T M880	-	-	2	2
D1020	Truck, 1 1/4 T M561	-	-	3	3
D1100	Truck, Platform, 1/2 T M274A5	-	-	22	22
D1160	Truck, Utility M151A2	-	-	24	24
E1060	Mortar, 60MM M19	4	-	-	12
E1090	Mortar, 81MM M29E1	-	8	-	8
[illegible]4175	Tracker, IR, GM, DRAGON SN-36	-	24	-	24

Figure III-107 - Selected Major End Items of Equipment-Marine Infantry Battalion

fourth rifle company requires additional communications-electronics equipments as depicted in figure III-108. The additional assets required for a four rifle company structure then equates to the comparative lift requirements as shown in

TAM NO.	END ITEM	3 RIFLE CO. INF. BN.	4 RIFLE CO. INF. BN.
A1415	Radar Set, AN/PPS-15	8	10
A1815	Radio Set, AN/GRC-160	11	13
A2020	Radio Set, AN/PRC-47	5	6
A2040	Radio Set, AN/PRC-75A	5	6
A2050	Radio Set, AN/PRC-77	58	68
A2390	Signal Lamp Equipment	10	12
A2635	Telephone Set, TA-838	18	21

Figure III-108 - Communications-Electronics Major End Items for Infantry Battalion

figure III-109. As can be seen, the relative impact of these additional items is minor.

				3 RIFLE CO. INF. BN			4 RIFLE CO. INF. BN.		
TAM NO.	SQ.FT	CU FT	WT	SQ FT	CU FT	WT	SQ FT	CU FT	WT
A1415	5.0	5.65	68	40.0	45.20	544	50.0	56.50	680
A1815	-	6.20	52	-	68.20	572	-	80.60	676
A2020	4.0	8.00	139	20.0	40.00	695	24.0	48.00	834
A2040	2.0	1.38	25	10.0	6.90	125	12.0	8.28	150
A2050	2.0	1.00	20	116.0	58.00	1160	136.0	68.00	1360
A2390	1.0	1.00	5	10.0	10.00	50	12.0	12.00	60
A2635	-	1.00	7	-	18.00	126	-	21.00	147
			TOTALS	196.0	246.30	3272	234.0	294.38	3907

Figure III-109 - Lift Requirements of Comm-Elect Major End Items

Having a significant impact upon mortar transport major end items of equipment is the near-term introduction of the Light, High Mobility Tactical Truck (5/4 Ton). This new, multi-purpose truck (4 x 4) will replace the current 1/4-, 3/4, and 1 1/4-ton tactical trucks presently in the existing

T/E of the infantry battalion. The vehicle will be a general purpose type for use in all jeep, radio communication, weapons carrier, utility cargo, personnel transport, and ambulance applications, and it will possess the capability for the addition of personnel protection. The small cargo trailers which are towed by the current light utility vehicles will be eliminated. The vehicle will have a diesel engine and an automatic transmission. It will be capable of adaptation to accomodate weapon mounts, weapon support systems, and the transporting of light loads cross-country. An objective of its design is the utilization of a high percentage of commercial components and the adoption of a common chassis. Initial Operating Capability (IOC) is 1983. Figure III-110 illustrates the multi-configurations of the vehicle.

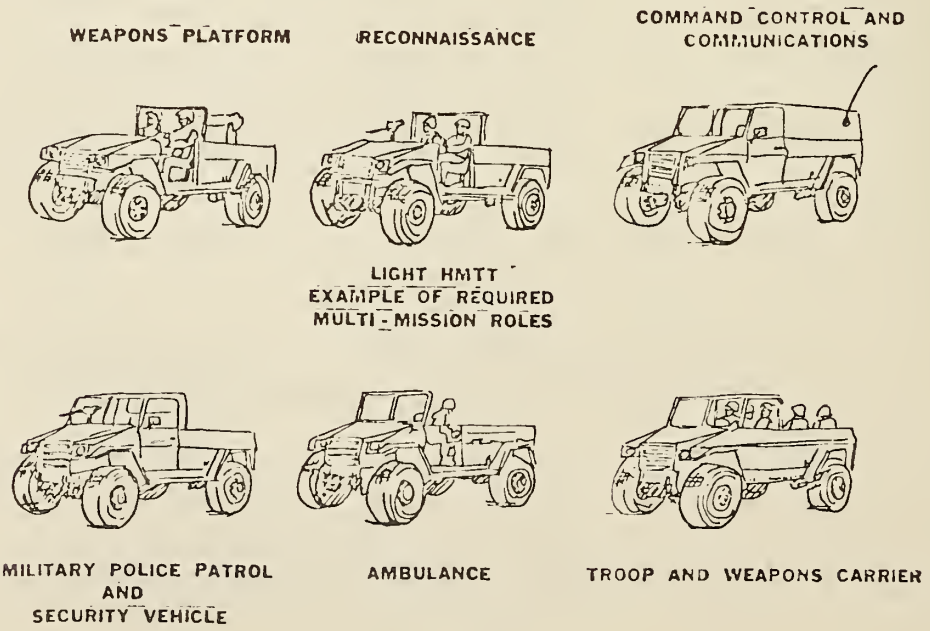


Figure III-110 - Light, High Mobility Tactical Truck (5/4 Ton)

Current assumptions call for a one-to-one replacement factor of the 5/4-ton truck. Figure III-111 compares the lift capacities presently existing and after introduction of the 5/4-ton truck into the infantry battalion's T/E. From this comparison, one can expect an increase of organic lift capability of the infantry battalion of 125%. This increase in lift capability is applied unilaterally to each candidate structure.

CURRENT MOTOR TRANSPORT END ITEMS

TAM NO.	DESCRIPTION	NO. VEHICLES	TONS OF LIFT CAPABILITY
00840	Trailer, ¼T, M416	22	5.50
00890	Truck, Ambulance, ¼T, M718A1	1	.25
01015	Truck, Cargo, 1¼T, M880	2	2.50
01020	Truck, Cargo, 1¼T, M561	3	3.75
01100	Truck, Platform, ½T, M274A1	22	11.00
01160	Truck, Utility, ¼T, M151A2	24	6.00
	TOTALS	74	29.00

REPLACEMENT MOTOR TRANSPORT END ITEMS

TAM NO.	DESCRIPTION	NO. VEHICLES	TOTAL TONS OF LIFT CAPABILITY
TBD	Light, High Mobility Tactical Truck, 5/4T, 4 x 4	52	65.00

Figure III-111 - Comparison of Lift Capabilities of Motor Transport End Items

The final candidate structure(s) will receive detailed logistical analysis to measure supportability and cost effectiveness. The preceding general logistics analysis identifies criteria for these structures so as to enhance potential combat

power for the optimal infantry battalion. Increased lift organic to the unit should enhance tactical mobility without degrading the capability to be foot and air mobile.

IV. FLEET MARINE FORCE ASSISTANCE

Field Evaluation

Introduction

- *Purpose*

The purpose of this portion of the section is to present the guidance for the conduct of the field evaluation of the rifle squad and crew-served weapons units phase of the study conducted at Camp Lejeune, North Carolina; to present analysis of the data obtained from the evaluation; to consider the results of the evaluation. This section will also present analysis of the data obtained from an opinion questionnaire completed by senior Marines of the Second Marine Division.

- *General*

The Commandant of the Marine Corps directed the Commanding General, Marine Corps Development and Education Command, during May 1979, to develop an optimum infantry battalion table of organization for the 1980's in coordination with the Force Commanders and the Commanding General, Fourth Marine Division. The guidance contained in the tasking from the Commandant of the Marine Corps directed that the new table of organization for the battalion structure be limited to approximately 900 Marines; structured for the most effective utilization of weapons, equipment, and technology of the eighties and that there would be no change in mission.

During early October 1979, the Commanding General, Marine Corps Development and Education Command requested the Commanding General, Fleet Marine Forces, Atlantic, to provide an infantry battalion to aid in the development of this optimal table of organization through field evaluation. The field evaluation would provide performance data and a realistic environment for measurement of effectiveness criteria such as mobility, maneuverability and controllability of the various candidate structures of the battalion. The intended evaluation would also provide needed insights to help in consideration of the following topics:

a. Two versus three platoons

b. Three versus four platoons

c. Two versus three squads

d. Two versus three fire teams

e. Eleven versus thirteen man squads

f. Crew-served weapons squad configurations

Measures that would be evaluated to gain data relating to the above topics were tactical mobility, command and control, maneuverability, attack (offense), control of terrain (defense), survivability and sustainability.

Due to operational commitments, the Second Marine Division provided a rifle company and a weapons company to assist MCDEC in the conduct of the evaluation. The First Battalion, Sixth Marines was assigned the mission to support this effort. General

guidance for the conduct of the field evaluation was provided the Battalion. This guidance was followed by several liaison visits to the Battalion by members of the Infantry Battalion Study Group to further coordinate specific details of the guidance, identification of any additional requirements and training areas. In addition to providing the rifle and weapons companies, the battalion also provided the field evaluators for collecting field data. These evaluators were either company grade officers or senior staff noncommissioned officers possessing the requisite skills and field experience to perform the required evaluation tasks. One evaluator was assigned to each unit being evaluated.

Two types of forms were used to acquire data on the evaluated units. Data evaluation forms were employed by the data collectors (evaluators) to make objective observations. The collected data was used to extend, in both breadth and depth, the observations of the Infantry Battalion Study Group members. Questionnaires were used to obtain subjective data (opinion) from the fire team leaders of the evaluated units. These questionnaires were simple in design and facilitated response while in the field.

The field evaluations took place at Camp Lejeune, North Carolina during 26-29 November 1979. The units evaluated were the rifle squad and various sized crew-served weapons units. The purpose of the rifle squad evaluation was to evaluate two configurations of the eleven man rifle squad in a tactical

environment. One configuration consisted of three -3 man fire teams and a second configuration consisted of two -5 man fire teams. Figure IV-1 identified the size, composition, MOS and T/O weapon of each member of the squad. Personal capabilities of the Marines themselves were not being tested; what was tested was the relative combat effectiveness of various alternative combat organizations and associated weapons systems.

BILLET	THREE -3 MAN FIRE TEAM				TWO -5 MAN FIRE TEAM			
	SIZE	RANK	MOS	WPN	SIZE	RANK	MOS	WPN
SQUAD LEADER	X	Sgt	0311	M16	X	Sgt	0311	M16
SQUAD GRENADIER	X	LCpl	0311	M16/ M203				
FIRE TEAM LEADER	X	Cpl	0311	M16	X	Cpl	0311	M16
AUTO RIFLEMAN	X	LCpl	0311	M16/ Auto	X	LCpl	0311	M16/ Auto
RIFLE/GRENADIER	X	Pvt	0311	M16/ M203	X	Pvt	0311	M16/ M203
RIFLE/GRENADIER					X	Pvt	0311	M16/ M203
RIFLEMAN					X	Pvt	0311	M16
FIRE TEAM LEADER	X	Cpl	0311	M16	X	Cpl	0311	M16
AUTO RIFLEMAN	X	LCpl	0311	M16/ Auto	X	LCpl	0311	M16/ Auto
RIFLE/GRENADIER	X	Pvt	0311	M16/ M203	X	Pvt	0311	M16/ M203
RIFLE/GRENADIER					X	Pvt	0311	M16/ M203
RIFLEMAN					X	Pvt	0311	M16
FIRE TEAM LEADER	X	Cpl	0311	M16				
AUTO RIFLEMAN	X	LCpl	0311	M16/ Auto				
RIFLE/GRENADIER	X	Pvt	0311	M16/ M203				

Figure IV-1 - Field Evaluation-Rifle Squad Test Configurations

Methodology

Six rifle squads were used each day during the evaluation period. The rifle squad was formed in either of the two configurations shown in figure IV-1 for an evaluation. There were two combat attacks that each squad conducted; namely, the frontal attack and the single envelopment. A total of twenty-four squad attacks were performed during the evaluation period consisting of twelve frontal attacks and twelve single envelopments.

The frontal attack covered a distance in excess of 500 meters in length over relatively flat and wooded terrain. Observation was generally reduced by the vegetation in the training area but did not make control of the squad difficult. Likewise, movement throughout the training area was generally good and provided few problems to the squad. The existence of marsh land and/or swamp land in the training area did not provide a problem during either of the two combat attacks. Careful reconnaissance of the area by the squad leaders and fire team leaders enabled the unit to maneuver around these obstacles in route to the objective. Six frontal attacks were conducted using the two -5 man fire team configuration. The remaining six frontal attacks used the three -3 man fire team configuration.

The single envelopment attack was conducted in the same training area (DB area in vicinity of Triangle Outpost) and

covered a distance in excess of 500 meters. Again, six attacks were conducted using the three -3 man fire team configuration and six attacks were conducted using the two -5 man fire team configuration.

The weather during the evaluation period was unseasonally ideal--clear, sunny and mild with temperatures varying between 70-74 degrees fahrenheit. This was a positive contributor to the evaluation as the weather immediately prior to the evaluation was a good deal cooler with intermittent rain.

Each squad attack (frontal or single envelopment) followed these basic steps: squad leader was provided the general and special situation from the evaluator, squad leader's issuance of the five paragraph order, leaders reconnaissance, movement to the objective, assault of the objective and consolidation. Blank rifle ammunition was used by the squad. Smoke grenades and trip flares (flash-bang type) were employed by the squad and/or the aggressors at the squad objective. The aggressors consisted of a squad size unit which was not being evaluated at the time. Each member of the squad being evaluated carried his T/O weapon and wore normal field equipment to include: helmet, cartridge belt, canteens, first aid kit, ALICE pack and entrenching tool.

The evaluation centered around the ability of the fire team leaders and squad leaders to control their unit(s) during the various phases of the attack. In addition to control, the

fire team leaders and squad leaders were also evaluated on their ability to change formations once crossing the line of departure. Evaluators and the MCDEC coordinators subjectively evaluated the firepower available during the attacks between the assault elements and the base of fire.

At the conclusion of each of the twenty-four squad size attacks, casualties were assessed within the squad by the evaluators. The evaluator assumed that the rifle squad was operating alone (as in a patrol or ambush) and assessed either two or four casualties immediately following the consolidation phase of the attack. The squad was required to tactically move their wounded to a helicopter landing zone a distance of 500 meters away. The purpose of the assessment was to determine what effects this would have on the ability of the squad to continue to operate effectively. The criteria used was basically the ability of the squad to carry the wounded and their equipment back to the helicopter landing zone (HLZ) while maintaining tactical integrity and providing 360 degree security along the route.

The load carried by the Marine infantrymen within each of the rifle squads was predesignated. Items of equipment that were carried did not vary from squad to squad and included normal field equipment.

Discussion

These evaluations did not portend to seek scientific, statistical significance. During these field evaluations, time

and personnel constraints precluded an extensive investigation of the rifle squads, rifle platoons and rifle companies. An extensive two-year investigation was conducted during 1972/73. That study revealed that an eleven man (two -5 man fire teams) squad was a workable, highly acceptable and competent combat unit. The purpose of this study was to reevaluate the eleven man rifle squad using both configurations (i.e., three -3 man fire teams and two -5 man fire teams) and, if possible, to revalidate the eleven man rifle squad as the building block for the rifle platoon and company. This action would free-up additional billets and would allow greater flexibility in leveling the optimal infantry battalion of 900 Marines.

- *Rifle Squad Evaluation*

The evaluations of the rifle squads were well-controlled and conducted over a two day period using a total of six rifle squads. Two squads were T/O by rank while four T/O squads were manned as they currently exist in the FMF (corporal squad leaders, lance corporal fire team leaders). The rifle squads were organized into either the three -3 man fire team or two -5 man fire team squad. During the two day period, each rifle squad conducted both a frontal and single envelopment attack using each squad configuration.

An evaluator, company grade officer, was assigned to each squad during the conduct of the attack. In addition, an officer from the battalion S-3 section acted as the overall coordinator

for each of the attacks (frontal and single envelopment). This officer coordinated between the rifle squads, evaluators, aggressors and the infantry battalion study personnel. He was responsible for the timely conduct of the squad problems and the immediate collection of the evaluator and personnel questionnaires at the end of each problem.

The evaluator's data was collected through the use of the evaluator questionnaire. In addition, a personnel questionnaire was completed by each squad leader and fire team leader of the rifle squad at the end of each "Test Leg." A "Test Leg" consisted of an attack (either frontal or single envelopemnt) and the evacuation of casualties to a helicopter landing zone (HLZ).

• *Rifle Squad Evaluation Results*

The evaluators were asked to evaluate the ability of the unit leader(s) to maintain control of their unit during the attack. The squad and fire team leaders were also asked to comment on this same question upon conclusion of the problem. As shown in figure IV-2, the evaluation of the three -3 man fire team squad configuration with regards to controllability was at best 50 percent. An overall average of 42 percent of the respondents answered that control was maintained during the attack. On the other hand, the worst case evaluation of the two -5 man fire team squad configuration was 50 percent. An overall average of 80 percnet of the respondents answered that control was maintained during the attack. It should also

be pointed out that 3 of the 8 respondent groups evaluated their units as all (100 percent) having maintained control in a two -5 man fire team squad configuration.

QUESTION: *Did the unit leader(s) maintain control during the attack?*

Percentage listed indicate those respondents who answered, "YES."

	EVALU-ATOR	SQUAD LDR	EVALU-ATOR	FIRE TM LDR
3-3 MAN FT's				
FRONTAL ATTACK	50%	50%	50%	28%
SINGLE ENVELOPMENT	33%	33%	50%	39%
2-5 MAN FT's				
FRONTAL ATTACK	50%	100%*	67%	58%
SINGLE ENVELOPMENT	100%*	83%	100%*	75%

Figure IV-2 - Control of the Squad in the Attack

Figure IV-3 shows the results of a question that again was directed to the unit leader's ability to maintain control. The evaluator's responses indicated that control was more difficult to achieve with a three -3 man fire team squad configuration. This occurred particularly during the fire and movement of a frontal attack and after the assault during the single envelopment attack. The squad leaders responses confirmed this fact and indicated that control was slightly more difficult to achieve with a three -3 man fire team squad configuration in

QUESTION: *At what point(s) did the unit leader(s) loose control?*

	EVALUATOR (6)	SQUAD LDR (6)	FIRE TM LDR (18) (12)
3-3 MAN FT's			
FRONTAL ATTACK			
Never had control	---	0	0
When changing formations	---	33%	16%
During movement to obj.	---	33%	0
During fire & movement	50%	33%	6%
During the assault	33%	16%	28%
After the assault	16%	0	6%
During casualty evac.	50%	50%	44%
SINGLE ENVELOPMENT			
Never had control	---	0	0
When changing formations	---	16%	6%
During movement to obj.	---	16%	6%
During fire & movement	0	0	6%
During the assault	0	16%	11%
After the assault	50%	67%	0
During casualty evac.	87%	84%	67%
2-5 MAN FT's			
FRONTAL ATTACK			
Never had control	---	0	0
When changing formations	---	16%	8%
During movement to obj.	---	0	8%
During fire & movement	16%	16%	16%
During the assault	16%	0	8%
After the assault	33%	0	0
During casualty evac.	67%	50%	50%
SINGLE ENVELOPMENT			
Never had control	---	0	0
When changing formations	---	33%	8%
During movement to obj.	---	33%	0
During fire & movement	0	16%	8%
During the assault	16%	0	8%
After the assault	16%	0	8%
During casualty evac.	16%	16%	33%

Figure IV-3 - Lack of Control of the Squad in the Attack

the frontal attack. The squad leaders responses indicated control was substantially more difficult to achieve after an assault following a single envelopment with a three -3 man fire team squad configuration. However, it should be noted that the gains

obtained at this phase with a two -5 man fire team squad configuration were somewhat offset by more difficult control prior to the assault phase (changing formations and movement to the objective). The fire team leaders responses did not significantly differentiate between squad configurations.

As shown in figure IV-4, the unit characteristics evaluated were control, firepower, flexibil ty and formations. The response by the evaluators, squad and fire team leaders was either "good" or "bad." The evaluators slightly favored the two -5 man fire team squad specifically in terms of control, firepower and formations. The squad leaders significantly favored the two -5 man fire team squad in all characteristics. Fire team leaders basically favored the three -3 man fire team squad in terms of control (this probably implies that the 3-man fire team is easier to control versus a 5-man fire team). The fire team leaders favored the 5-man fire team in terms of flexibility and firepower.

The field evaluation also attempted to gain responses from the squad leaders and fire team leaders concerning the size of the fire team. Figure IV-5 shows that the squad leader responses were mixed and inconclusive concerning the 3-man fire team. The squad leader responses significantly adjudged the 5-man fire teams as "about right" for the frontal attack and single envelopment . The fire team leader responses adjudged the 3-man fire team as "too small" and significantly adjudged the 5-man fire team as "about right."

QUESTION: *Which of the following characteristics do you consider as "good" or "bad?"*

	EVALUATOR* GOOD	EVALUATOR* BAD	SQUAD LEADER GOOD	SQUAD LEADER BAD	FIRE TEAM LDR GOOD	FIRE TEAM LDR BAD
3-3 MAN FT's						
FRONTAL ATTACK						
Control	67%	50%	67%	33%	94%	6%
Firepower	0	50%	50%	50%	67%	33%
Flexibility	67%	0	50%	50%	83%	16%
Formations	0	0	67%	33%	100%	0
SINGLE ENVELOP.						
Control	0	33%	67%	33%	72%	18%
Firepower	0	67%	33%	67%	50%	50%
Flexibility	33%	50%	67%	33%	67%	33%
Formations	0	33%	83%	16%	94%	6%
2-5 MAN FT's						
FRONTAL ATTACK						
Control	100%	16%	100%	0	75%	25%
Firepower	50%	0	67%	33%	92%	8%
Flexibility	50%	50%	83%	16%	67%	33%
Formations	50%	16%	100%	0	91%	9%
SINGLE ENVELOP.						
Control	00%	0	100%	0	75%	25%
Firepower	33%	33%	83%	16%	92%	8%
Flexibility	16%	16%	83%	16%	91%	9%
Formations	0	0	100%	0	100%	0

*Due to the nature of evaluation, questionnaire design, responses (good or bad) may exceed 100%

Figure IV-4 - Characteristics of a Rifle Squad in the Attack

One of the more significant findings during the field evaluation of the rifle squad was its inability to handle casualties. Two or four casualties were assessed each rifle squad upon completion of the consolidation phase of the attack. An assumption was made that the rifle squad was operating by itself (i.e., squad ambush or patrol). The squad was required

QUESTION: *For the tasks assigned to a fire team, comment on the fire team size.*

	SQUAD LEADER	FIRE TEAM LEADER
3-3 MAN FT's		
FRONTAL ATTACK		
Too large	16%	0
Too small	33%	56%
About right	33%	33%
I can't say	16%	11%
SINGLE ENVELOPMENT		
Too large	16%	0
Too small	33%	67%
About right	33%	28%
I can't say	16%	5%
2-5 MAN FT's		
FRONTAL ATTACK		
Too large	0	18%
Too small	16%	9%
About right	83%	73%
I can't say	0	0
SINGLE ENVELOPMENT		
Too large	0	0
Too small	16%	16%
About right	67%	83%
I can't say	16%	0

Figure IV-5 - Size of the Fire Team

to tactically move the casualties to a helicopter landing zone, a distance of 500 meters away.

As shown in figure IV-6, two casualties inflicted upon a unit with three -3 man fire teams caused security problems. In all respondent cases, two casualties inflicted upon a unit with two -5 man fire teams did not create serious security problems.

QUESTION: *During evacuation (i.e., movement to a HLZ) of casualties, could the unit maintain adequate security for itself?*

Percentages are those that answered, "YES."

	EVACUATOR	SQUAD LDR	FIRE TM LDR
3-3 MAN FT's			
Two Casualties	50%	50%	41%
Four Casualties	16%	0	11%
2-5 MAN FT's			
Two Casualties	83%	83%	82%
Four Casualties	33%	50%	27%

Figure IV-6 - Squad Security During Casualty Evacuations

In those cases where four casualties were assessed, the rifle squad experienced a great deal of difficulty in their movement to the HLZ. Frequent rest stops were required and the wounded and their equipment were repeatedly shifted among the remaining personnel in the squad (to include squad and fire team leaders). More often, personnel assigned to provide security for the movement were over-burdened with carrying the helmets, packs and weapons of the wounded personnel. No equipment, however, was left behind. All of the squad leaders and most of the fire team leaders agreed that four casualties in a three -3 man fire team squad configuration caused severe security problems and rendered the squad ineffective to protect itself during the evacuation. The security problems in the evacuation of four casualties in a two -5 man fire team squad configuration were less severe.

• *Crew-served Weapons Evaluation*

The evaluations at Camp Lejeune also sought to identify the optimal sizes of crew-served weapons units. The following crew-served weapons units were evaluated:

•• 7 versus 9-man M60 Machine Gun Squad

•• 3 versus 4-man 60mm Mortar Squad

•• 16, 18, 20 versus 22-man 81mm Mortar Section

The evaluations were based upon the MCCRES Standard Performance Test: 2X.1 (2) - Foot Mobility - Crew-served Weapons Mobility Test; 2X.5.9 - M60, 7.62mm, Machinegun; 2X.6.12 - M19, 60mm Mortar and 2X.7.16 - M29E1, 81mm Mortar. The first test dealt with a foot mobility march and the other three tests dealt with position selection and preparation of each type crew-served weapon.

The purpose of the evaluation of the various sized crew-served weapons units was:

a. To evaluate the ability of infantry Marines to march a given distance in a given time while carrying their assigned (squad or section) equipment.

b. To measure the effects (interms of stamina and performance) on these squads in a sustained environment (by repeating the march distance three times each day for two days).

c. To determine these same effects on squads/sections of different size and configuration, when required to carry the same weapons system load.

d. To evaluate the performance of the Marines in position selection and preparation of crew-served weapons positions.

The crew-served weapons units evaluation was conducted in four phases:

a. Phase I - Foot Mobility March - a four kilometer march conducted in less than fifty minutes with no stragglers. A ten minute break was taken at the end of the four kilometer march.

b. Phase II - Foot Mobility March - Same criteria as Phase I.

c. Phase III - Position Selection, Preparation and Emplacement of Crew-served Weapons - a time limit of four hours was authorized.

d. Phase IV - Foot Mobility March - Same criteria as Phase I.

The individual and crew-served weapons loads carried by the Marine infantrymen within the alternate crew-served weapons units was predesignated and consisted of the fighting load and the existence load. The fighting load consisted of equipment which the individual Marine carried in the assault, excluding weapons. The existence load, which was not carried during the evaluation, consists of those items that the individual requires to live in the field but which are not essential in the assault. Each Marine involved in the crew-served weapons units evaluation

carried the existence load, individual weapon plus ammunition, a part of a crew-served weapon system and a proportioned amount of ammunition.

The members of the crew-served weapons units were weighed to determine the weight of the individual load. See figure IV-7. These weights were averaged to include all members of the squad or section. The squad and section leaders' load was included in the average. Weights included that of the regulation utility uniform (trousers and jacket), underwear, socks, boots and soft cover which were worn by all personnel. No provision was made for the weight of hand grenades, smoke grenades, etc., that may be carried by the individual in an actual combat situation. Almost of necessity, the weight of the loads dictates that a means of mobility or transportation be retained or added to the infantry battalion Table of Equipment to sustain itself in combat.

- *Machinegun Squad Evaluation and Results*

The seven man M60 machinegun squad consisted of a squad leader, two machinegun team leaders, two gunners and two ammunition men. The nine man M60 machinegun squad was organized the same except two additional ammunition men were added. A total of four -7 man M60 machinegun squads were evaluated over the two-day period utilizing two -7 man M60 machinegun squads per day. Two -9 man M60 machinegun squads were evaluated during the same time. Figure IV-8 highlights the evaluation results. The results show that, basically, there is little difference

UNIT	COLUMN 1	COLUMN 2
Three Man 60mm Mortar Squad	94.9	113.3
Four Man 60mm Mortar Squad	80.4	98.8
Seven Man M60 Machinegun Squad	55.8	74.2
Nine Man M60 Machinegun Squad	46.8	65.0
Sixteen Man 81mm Mortar Section	87.4	105.8
Eighteen Man 81mm Mortar Section	83.6	102.0
Twenty Man 81mm Mortar Section	81.9	100.3
Twenty-two Man 81mm Mortar Section	79.6	98.0

Weight in pounds

Column 1 - Fighting Loads

Column 2 - Fighting and Existence Load

The Existence load was not carried during the evaluation. These weights should be considered as representative only.

Figure IV-7 - Individual Average Loads

in the performance between both types of machinegun squads. The squads performed the foot mobility march in less than the times prescribed by MCCRESS standards with no stragglers. The evaluators comments concerning the overall performance of the machinegun squads appear in the right hand column of figure IV-8. The squad's performance in site selection, preparation

and emplacement of the crew-served weapons was equally complimentary.

•• *60mm Mortar Squad Evaluation and Results*

The three man 60mm mortar squad consisted of a squad leader/gunner, assistant gunner and an ammunition man. The four man configuration consisted of a squad leader, gunner, assistant gunner and an ammunition man. A total of four -3 man 60mm mortar squads were evaluated over the two day period utilizing two squads per day. Two -4 man 60mm mortar squads were also evaluated during the same time. The individual loads for each type of mortar squad were extremely heavy. The performance by both squads was mixed. There were one or more stragglers in both types of squads on the foot mobility march. The mortar squads did redistribute the loads during a rest break which reduced or eliminated further straggling on subsequent legs of the foot mobility march. The evaluators indicated that the weight of the individual loads was the only reason for stragglers within the squad. The evaluators indicated that a three man 60mm squad is a functional unit and can operate the mortar equipment efficiently. If 60mm mortar ammunition could be spread throughout the rifle company, a three man mortar squad was acceptable. A four man mortar squad provided enough men to prepare positions and maintain good security during the preparation period. In almost every case,the evaluators adjudged the squad's site selection, preparation and emplacement of the crew-served weapons as outstanding.

MOBILITY UNIT	PHASE I		PHASE II		PHASE III	PHASE IV		COMMENTS
	TIME	STRAGGLERS	TIME	STRAGGLERS	TIME	TIME	STRAGGLERS	
1 M60MG-9 MAN	35	0	35	0	165	50	0	VERY MOTIVATED
2 M60MG-9 MAN	33	0	30	0	200	48	0	HIGHLY MOTIVATED
3 M60MG-7 MAN	39	0	38	0	190	35	0	OUTSTANDING JOB
4 M60MG-7 MAN	38	0	42	0	195	42	0	NONE
5 M60MG-7 MAN	37	0	35	0	122	37	0	STRONG GROUP
6 M60MG-7 MAN	43	0	43	0	180	44	0	NONE
7 60mm MORTAR-3 MAN	38	0	37	0	150	39	0	OUTSTANDING TEAM
8 60mm MORTAR-3 MAN	38	0	39	0	150	48	0	OUTSTANDING JOB
9 60mm MORTAR-3 MAN	75	3	46	0	164	43	0	LOADS TOO HEAVY
10 60mm MORTAR-3 MAN	40	0	40	0	185	46	0	OID WELL
11 60mm MORTAR-4 MAN	37	1	39	1	155	48	0	SLOW DUE TO WEIGHT
12 60mm MORTAR-4 MAN	40	2	40	2	185	46	0	HEAVY LOADS
13 81mm MORTAR-22 MAN	37	0	40	0	220	36	0	NONE
14 81mm MORTAR-20 MAN	38	0	35	0	220	45	0	NO PROBLEMS
15 81mm MORTAR-18 MAN	45	0	49	0	213	45	0	PHASE II HAROEST/ MOST TAXING
16 81mm MORTAR-16 MAN	46	2	40	1	240	50	0	LOADS TOO HEAVY

Figure IV-8 - Crew-Served Weapons Evaluation Results

•• *81mm Mortar Section Evaluation and Results*

Four different sized units of the 81mm mortar section were evaluated during the two day period. The mortar section total strength included the section's assets of three communicators from the Communications Platoon. The basic change to the 81mm mortar section was either the addition or deletion of the ammunition men in either the 81mm mortar section headquarters or within the mortar squad. The equipment carried by the section was predesignated.

The *22-man 81mm mortar section* experienced no problems during the evaluation. As shown in figure IV-8, the section easily met the MCCRES standards for the foot mobility march and experienced no stragglers. Their performance in site selection, preparation and emplacement of the crew-served weapons was excellent.

The *20-man 81mm mortar section* performed similarly to the 22-man mortar section. The only difference in performance between the two sections appeared in Phase IV. The 20-man section met the MCCRES standards but was slower than the 22-man section during Phase IV of the evaluation. Although not explicitly stated by the evaluator, it would appear to be directly attributable to the weight of the loads. Using a 20-man mortar section caused little, if any problem. The site selection, preparation and emplacement of weapons was excellent.

The *18-man 81mm mortar section* began to feel the heavy loads of the section. The amount of time to complete each foot mobility march increased over the 22- and 20-man mortar section and began to approach the maximum time allowed by the MCCRES standards. They experienced no stragglers and few problems in site selection, preparation and emplacement of weapons. The evaluator emphasized that Phase II was the hardest and most taxing on the Marines because of the loads.

The *16-man 81mm mortar section* experienced the greatest difficulty in the foot mobility marches. The difficulty was directly related to the weight of the loads. The times shown in figure IV-8 for the march appear to be within MCCRES standards. However, it was interpreted that during Phase I, fourteen of the 16-man section completed the 4000 meter march at 46 minutes. The two stragglers did not complete the 4000 meter march within the 50 minute time limit. This interpretation also applied to Phase II. The evaluator's comments clearly indicated that loads were too heavy. This was demonstrated by Marines not meeting the minimum march standards.

- *Conclusions*

Although the rifle squad field evaluation period was brief (two days) and the number of units involved were relatively few (six), a very intense and closely-observed evaluation was conducted during the period. Twenty-four squad attacks were conducted by spirited and highly enthusiastic Marines and were professionally coordinated by the evaluators.

Upon analysis of the collected data, the following conclusions were made concerning the rifle squad:

a. Given the choice between the two squad configurations, the squad leaders, fire team leaders and most of the evaluators, overall, favored the two -5 man fire team squad configurations.

b. The two -5 man fire team squad offers greater control at the squad leader level, but less flexibility.

c. The five man fire team offers greater flexibility at the fire team level, more firepower, more formations, but a slightly less degree of control.

d. Firepower at the squad level is affected during the conduct of a single envelopment in either configuration.

e. The two -5 man fire team squad can better conduct independent casualty evacuation with better security.

The following conclusions were made concerning the optimal sizes of the crew-served weapons units:

a. The seven-man M60 machinegun squad was considered satisfactory.

b. The weight of the individual's load within the 60mm mortar squad requires a minimum of four men. However, if ammunition can be distributed throughout the rifle company, the mortar squad could be reduced to a three-man crew.

c. The 20-man (including three communicators) 81mm mortar section was considered acceptable.

d. The 18-man 81mm mortar section was not preferred but was marginally acceptable.

Infantry Battalion Structure Questionnaire

An opinion questionnaire was completed at Camp Lejeune in connection with the field evaluations described previously. The questionnaire was designed to gather quantifiable responses to broad and detailed considerations in developing an optimal 900-man infantry battalion, and to provide a forum for expression of opinions, concerns and viewpoints on this matter. The questionnaire was prepared by the Infantry Battalion Structure Study Group at Quantico and was provided to the Second Marine Division during November 1979. Through the efforts of the Assistant Chief of Staff G-3 and his staff, the 18-page questionnaire was distributed to forty-three officers in key leadership billets within the three infantry regiments. The respondents were field grade officers (Infantry Regimental and Battalion COs and XOs), Marine captains in field grade billets (infantry battalion S-3) and selected senior captains with extensive time in the FMF.

Respondents were asked to bear in mind that normal responses would seek "more" of everything. This, however, could not always occur in structuring a unit of predetermined size. Respondents were cautioned that when they sought "more" or "expansion" of an element in the structure, that in all likelihood, some other area, weapon, unit, billet, etc., would have to be eliminated or degraded to some extent.

A summary of responses follows each question. For some questions, whose possible answers were fixed, such as yes-no or more-same-less questions, the respondents gave at most one answer. These responses are presented as a percentage of all forty-three participants. Because not all participants answered each question, these percentages may not add to 100 percent.

The remaining questions permitted free answers, such as lists of factors or reasons to support an opinion. Each item in a response was tallied in a major response category. One response (to a question) could contain many items and add to the tally of many response categories. Because of this variability, the tallies are presented without normalizing. Response categories are listed in order of decreasing tallies.

A.1. *What do you consider the three greatest weaknesses of today's infantry battalion?*

TALLY	RESPONSE CATEGORY
20	Lack of personnel
17	Mobility
12	Personnel turbulence
12	Better anti-armor weapons
9	Better comm gear
8	Better weapons in general
7	Training in general
7	More firepower
7	Need a 4th maneuver element
6	Air defense weapons
5	NBC and cold weather training
3	More DRAGON
2	Discipline and moral problems
1	More EW weapons
1	Consolidated admin poor
1	Size of H & S Co

A.2. *What do you consider the three greatest strengths of today's infantry battalion?*

TALLY	RESPONSE CATEGORY
26	Flexibility
17	Individual Marines
13	Mobility
5	Supporting arms
5	Battalion organization
4	Anti-armor capability
4	Espirit

A.3. *Do you consider today's infantry battalion capable of meeting and defeating today's threat?*

a. Yes 67% b. No 33%

A.4. *Why/why not?*

Infantry battalion can meet the threat because:

TALLY	RESPONSE CATEGORY
6	Capability to task organize battalion
6	Supporting arms
5	Individual Marines
3	Individual Marines training and experience
1	Better C^2
1	More responsiveness

Infantry battalion cannot meet the threat because:

TALLY	RESPONSE CATEGORY
11	Lack of mech/anti-mech capability
5	Lack of firepower
3	Lack of mobility
2	Lack of sustained capability
1	Training
1	NBC

[For this question, the "Threat" was undefined and, hence, different criteria was used by each respondent to evaluate the battalion. Sixty-seven percent of the respondents answered that the infantry battalion was capable of meeting and defeating today's threat.]

B.1.a. *Do you prefer an infantry battalion structured with four reduced-size rifle companies or with three normally (traditionally)-sized rifle companies? (check one)*

(1)	Four reduced-sized	51%
(2)	Three full-size	49%

B.1.b. *List three advantages which prompted your selection.*

4 Rifle Companies

TALLY	RESPONSE CATEGORY
19	Flexibility
13	Increased reserve potential
5	More firepower
4	Better C^2
2	Ample leadership structure in case of expansion

3 Rifle Companies

TALLY	RESPONSE CATEGORY
10	Better Battalion C^2
8	More combat power/maneuver element
7	Fewer leadership billets
5	Less logistic problems
4	Familiar doctrine and capability
4	Provides better training
4	Less vulnerable to attrition and extra duties

[Not all officers assumed that the three versus four rifle company variation of the infantry battalion had the same total number of men. Others were not sure if the Weapons Company was an additional unit. Fifty percent of the respondents favored the four rifle company battalion while the other half favored the three rifle company battalion.]

B.1.d. *In order to obtain a four-rifle company structure, would you be in favor of three traditionally organized companies and one company of reduced size, but with special capabilities (e.g., scouts, target acquisition, reconnaissance as well as rifle platoons)? (check one)*

(1) Yes 7% (2) No 86%

B.1.e. *What advantages would this type structure afford?*

In favor of three traditional rifle companies and one Special Capabilities company:

TALLY	RESPONSE CATEGORY
6	Consolidated training
4	Make assets available to Battalion Commander and provides intelligence
2	CP security and reserve potential
2	Flexibility of maneuver

B.1.f. *What disadvantages would this type structure create?*

TALLY	RESPONSE CATEGORY
18	Incapacitate 4th Co as a maneuver or reserve
8	Duplication of functions at Division or H&S Co
7	Training problems
6	Take riflemen out of companies
5	Lack of leadership for the special Company
5	Capabilities should be organic to Companies

B.2. *Considering only those weapons organic to the infantry battalion:*

a. *Do you feel you have an adequate weapons-system type mix?*

Yes 28% No 70%

B.2.b. *If your answer is no, which weapons would you increase or decrease?*

(1) M16	Increase 7%	(5) M202	Increase 9%		
	Decrease 14%		Decrease 19%		
(2) M203	Increase 16%	(6) LAAW	Increase 33%		
	Decrease 5%		Decrease 7%		
(3) M60 MG	Increase 35%	(7) 81mm Mortar	Increase 16%		
	Decrease 0%		Decrease 5%		

(4) 60mm Mortar Increase 12% Decrease 5%

(8) DRAGON Increase 42% Decrease 7%

B.2.c. *Would you favor complete elimination of any of these weapons types?*

Yes 42% No 58%

B.2.d. *If yes, which one(s), in order:*

TALLY	RESPONSE CATEGORY
12	Eliminate M202
2	Eliminate M203
1	Eliminate DRAGON
5	Replace/improve M202
5	Replace/improve LAAW
4	Replace/improve M16
1	Replace/improve DRAGON
1	Replace/improve Mortars
1	Replace/improve M60

B.2.e. *Would you favor addition of any other weapon to the organic weapons inventory of your battalion?*

(1) Yes 74% (2) No 26%

B.2.f. *If yes, which one(s)?*

TALLY	RESPONSE CATEGORY
16	TOW
13	106RR type weapon
8	REDEYE/STINGER
5	4.2" mortar
3	Heavy machinegun
2	VULCAN
2	RPG type weapon

3.a. *What element(s) of your current organizational structure adversely affect(s) the battalion's mobility?*

TALLY	RESPONSE CATEGORY
15	Lack of vehicles or motor transport assets
6	Need more Armored personnel carriers or troop vehicles
3	Need more Trucks for Headquarters and Service Company
2	Need more Ammunition
5	Vehicular limitations
4	Gamma Goat
4	M2745A ½ Ton platform truck
5	The amount of gear the battalion must carry
3	Poor organization and communication
1	Physical fitness

3.b. *Do you favor creation of an Infantry Fighting Vehicle concept organic to the infantry battalion?*

(1) Yes 37% (2) No 63%

3.c. *Why/why not?*

In favor:

TALLY	RESPONSE CATEGORY
8	Transport and man vulnerability
7	Firepower
7	Protection
2	Value as a command or recon vehicle

Opposed:

TALLY	RESPONSE CATEGORY
11	Draw on infantryman assets
8	Attach IFV's from a separate organization
7	Limits helolift and shipping capability
7	LVTP-7 is adequate

4.a. *Do you consider NBC Officers and/or NBC Specialists imperative to your T/O?*

(1) Yes 88% (2) No 12%

4.b. *Do you desire more or less of these specialized billets within your unit?*

(1) More 65% (2) Less 12%

4.c. *Do you consider your NBC training adequate for survival on the battlefield?*

(1) Yes 12% (2) No 88%

4.d. *Do you consider your NBC equipment adequate for survival on the battlefield?*

(1) Yes 12% (2) No 86%

5.a. *Do you consider any of your current communications equipment as unnecessary?*

(1) Yes 16% (2) No 80%

5.b. *Which items?*

TALLY	RESPONSE CATEGORY
3	KY-38
2	KYK-38
1	Signal lamps and flags
1	Teletype

General comments:

TALLY	RESPONSE CATEGORY
5	Reduce size and weight
3	Replace all equipment

6.a. *Do you consider the presence of a Night Observation Device (NOD) section essential to your structure?*

(1) Yes 63% (2) No 37%

6.b. *Why/why not?*

Opponents:

TALLY	RESPONSE CATEGORY
7	Riflemen can do the job
4	NOD is too cumbersome
2	"Nice but not essential"

Proponents:

TALLY	RESPONSE CATEGORY
11	Increase night operations capability
3	Increase weapons' range at night
2	Required for unassisted night attack
2	Enemy has such devices

6.c. *Do you consider the presence of a Radar (PPS-5, PPS-15) Section essential to your structure?*

(1) Yes 56% (2) No 42%

6.d. *Why/why not?*

Favorable comments:

TALLY	RESPONSE CATEGORY
7	Long range detection
5	Surveillence at night and bad weather
1	Saves manpower in the role of surveillance

Unfavorable comments:

TALLY	RESPONSE CATEGORY
5	Unreliable
4	Ineffective or not employed
4	Rifle company patrols can do the same job
3	Radars should be at regiment

6.e. *Do you have a critical need for scout/snipers at the battalion level?*

(1) Yes 72% (2) No 28%

6.f. *Of those items of equipment associated with surveillance and target acquisition, which would you eliminate, if any?*

TALLY	RESPONSE CATEGORY
12	Radars
4	NOD's
2	Metascopes
2	All STA equipment
1	PSID's
1	Scout/snipers

7.a. *Should the Weapons Company Commander also be Fire Support Coordinator?*

(1) Yes 74% (2) No 26%

7.b. *Why/why not?*

In favor:

TALLY	RESPONSE CATEGORY
13	Lend stability and continuity to Bn FSCC
8	Best man for the job
4	Just appropriate
3	Jobs didn't conflict
1	Who else
1	Train infantry in the use of fire support

Opposed:

TALLY	RESPONSE CATEGORY
7	Lack of training and experience
4	Conflict of jobs
2	Artillery is better qualified

7.c. *Do you consider his current training adequate to properly fulfill his defined tactical role?*

(1) Yes 56% (2) No. 42%

7.d. *Which T/O rank and MOS do you consider as best suited for this billet? (check one)*

(1) Major, 0302 9%

(2) Captain, 0302 37%

(3) Major, 0802 9%

(4) Captain, 0802 42%

7.e. *Explain.*

Infantry MOS:

TALLY	RESPONSE CATEGORY
10	Knowledge of infantry's FS requirements and tactical integration of FS
6	Just qualified

Artillery MOS:

TALLY	RESPONSE CATEGORY
4	Captain is best under S-3, Major
3	Captain is adequate
3	Major carries more authority and implies more experience

7.f. and g. *In your opinion (and experience), who is best suited to be the Fire Support Coordinator?*

Infantry Officers: 13

TALLY	RESPONSE CATEGORY
8	Weapons Company Commander
2	Captain
3	Unspecified

Artillery Officers: 22

TALLY	RESPONSE CATEGORY
9	Captain
5	DS Battery Commander
3	Unspecified
2	Weapons Company Commander

TALLY	RESPONSE CATEGORY
1	Major
1	Artillery liaison
1	0802 from DS Artillery Battalion

7.h. *Would the addition of Air Defense type weapons (e.g., REVEYE/STINGER) to your battalion drastically stretch your fire support coordination capacity?*

(1) Yes 30% (2) No 60%

7.i. *Why/why not?*

Fire support coordination capacity uneffected:

TALLY	RESPONSE CATEGORY
3	Air Liaison Officer can control
3	Bn with Air Liaison Officer advice can control
3	SOP practice and limited sectors of fire would simplify control

Problems seen in control:

TALLY	RESPONSE CATEGORY
4	More communications equipment and representatives in the FSCC
3	Air Defense weapons belong in the weapons Company or Artillery Battalion
2	Lack of infantry experience and manpower for control

7.j. *How would you control their fires?*

TALLY	RESPONSE CATEGORY
14	FSC
12	Air Officer
4	FAC for peripheral control
4	Company for peripheral control
3	DASC or TAOC for central control

7.k. *Do you perceive a need for a Naval Gunfire (Liaison) Officer organic to your structure?*

(1) Yes 12% (2) No 88%

7.l. *Why/why not?*

TALLY	RESPONSE CATEGORY
23	Attach a NGLO when necessary
7	FSCC can handle the job

7.m. *Considering the expanded range and capability of the Light-Weight Company Mortar System (LWCMS), is there a need for Forward Observer Teams for this weapon system?*

(1) Yes 23% (2) No 56%

7.n. *Why/why not?*

Opposed:

TALLY	RESPONSE CATEGORY
20	Control and FO jobs are for Company Commander, platoon and squad leaders
8	Arty and 81mm sections could control
2	FSCC control with FO's

7.o. *Do you perceive a need for the battalion FSCC to monitor (or control) the fires delivered by the LWCMS?*

(1) Yes 37% (2) No 44%

C.1.a. *Considering consolidation of administration at battalion-level, is there a need for maintaining a T/O billet of Rifle Company Executive Officer (Lt/0302)?*

(1) Yes 100% (2) No 0%

C.1.b. *Why/why not?*

In support of the Company XO

TALLY	RESPONSE CATEGORY
35	Administrative overload
15	Job of training and logistics
8	XO is second in command

C.1.c. *Same question as C.1.a. but for the First Sergeant (1st Sgt, 9999)?*

(1) Yes 95% (2) No 2%

C.1.d. *Why/why not?*

In support of the Company First Sergeant:

TALLY	RESPONSE CATEGORY
18	Administrative duties
16	Leadership and advice
11	Maintaining morale and setting an example

In support of the elimination of the First Sergeant Billet:

TALLY	RESPONSE CATEGORY
1	The XO could take over First Sergeant duties

C.1.e. *Would you favor reassigning one Administrative Clerk (pvt, 0151) from the current S-1 section back to the Rifle Company Headquarters?*

(1) Yes 79% (2) No 21%

C.1.f. *Within the rifle platoon, do you favor (pick one):*

(1) 3 squads, 2 fire teams each (5-man FT) 44%

(2) 2 squads, 3 fire teams each (3-man FT) 5%

(3) 2 squads, 3 fire teams each (4-man FT) 2%

(4) Other (specify):
3 squads, 3 fire teams each (4-man FT) 47%

C.1.g. *Why/why not?*

Three squads/two fire teams of five men

TALLY	RESPONSE CATEGORY
6	Flexibility
6	Virtue of triangular structure
5	Firepower and ability to sustain casualties
2	Easier C^2 for the squad leader

Two squads, three fire teams (3-man FT): No comment

Two squads, three fire teams each (4-man FT): No comment

OTHER:

Three squads/three fire teams of four men

TALLY	RESPONSE CATEGORY
8	Flexibility and maneuverability
5	Firepower and less vulnerable to casualties
4	Triangular structure for platoon and squad leaders
4	The standard set up is okay

Three squads/three fire teams of three men:

TALLY	RESPONSE CATEGORY
5	Triangular control structure

C.1.h. *Do you favor the retention of rifle company machine-gun assets within the Weapons Platoon, or permanently assigned to rifle platoons?*

(1) In Weapons Platoon 86

(2) In Rifle Platoons 14

C.1.i. *Why/Why not?*

With weapons platoon:

TALLY	RESPONSE CATEGORY
26	Optimize training and maintenance
20	Flexibility of employment by having guns centrally located
4	Weapons platoon commander can better direct

With rifle platoons: 5

C.1.j. *Is a 3-man mortar squad adequate?*

(1) Yes 60% (2) No 30%

C.1.k. *Why/why not?*

Not adequate because:

TALLY	RESPONSE CATEGORY
23	3 man crew could not transport enough ammunition
4	Attrition problems
2	Cross training would be required
1	Security problems

C.1.l. *Would you favor equipping assault section personnel in the Weapons Platoon with DRAGON missiles?*

(1) Yes 58% (2) No 40%

C.1.m. *Why/why not?*

DRAGON missile for assault section personnel:

TALLY	RESPONSE CATEGORY
13	Provides capability justified by armor threat
6	Riflemen can carry LAAW's
4	Increase firepower
2	Range is within company limits

No DRAGON's for assault section:

TALLY	RESPONSE CATEGORY
6	Training, maintenance, and control should be centralized
5	Training too complex
4	A different weapon is needed for company

C.2.a. *Do you consider both a First Sergeant (1st Sgt 9999) and an Operations Chief (MSgt, 0369) essential to the weapons Company HQ structure?*

(1) Yes 56% (2) No 35

C.2.b. *Which, if any, would you eliminate? (pick one)*

(1) 1st Sgt 7%

(2) Ops Chief 6%

(3) Both 0%

(4) Neither 56%

C.2.c. *What do you consider to be the minimal number of DRAGON sections required to provide you with anti-armor capability?*

TALLY	RESPONSE CATEGORY
22	4 sections
4	3 sections
3	1 section/co
2	6 sections
1	8 sections
1	1 section

[This question generated a few ambiguous replies that do not appear in the tally]

C.2.d. *Do you consider 8 DRAGON teams per section as essential?*

(1) Yes 56% (2) No 23%

C.2.e. *Why/why not?*

Eight teams are essential:

TALLY	RESPONSE CATEGORY
11	High armor threat
7	Firepower and flexibility
4	Effects of attrition

C.2.f. *If not, then how many?*

TALLY	RESPONSE CATEGORY
6	Six teams
2	Twelve teams
1	None are needed

C.2.g. *What do you consider to be the minimal number of 81mm mortar sections required to provide you with indirect fire support?*

Four sections required 56%

Three sections required 14%

C.2.h. *Why?*

Four sections required:

TALLY	RESPONSE CATEGORY
10	One section per company
7	Necessary to maintain firepower while displacing
6	Four section scheme works
1	One section per company, one for battalion

Three sections required:

TALLY	RESPONSE CATEGORY
1	One section per company
1	Not effective in a high mobility environment

[The question did not specify a particular battalion structure. The comment "one section per company" was made by both three and four section proponents.]

C.2.i. *What is the minimal number of personnel per 81mm mortar section required for that section to properly, functionally perform?*

TALLY	RESPONSE CATEGORY
4	22 men/section
3	15 men/section
2	30 men/section
2	18 men/section
1	19 men/section
1	12 men/section
1	10 men/section

[This question generated a few ambiguous replies that do not appear in the tally.]

C.2.j. *Do you feel that an Assistant 81mm Mortar Platoon Commander is required?*

(1) Yes 47% (2) No 35%

C.2.k. *Why/why not?*

TALLY	RESPONSE CATEGORY
16	81mm mortar platoon needs an Assistant Commander
12	Assistant is not required, others can handle the job

C.2.l. *Do you feel that a requirement exists for a dedicated Fire Direction Center (FDC) section?*

(1) Yes 77% (2) No 7%

C.2.m. *Why/why not?*

Dedicated FDC

TALLY	RESPONSE CATEGORY
10	Good training, proficiency and stability
3	Weapons Company could handle the task

C.2.n. *Do you favor shifting STA platoon assets from H&S Company to Weapons Company?*

(1) Yes 44% (2) No 42%

C.2.o. *Why/why not?*

TALLY	RESPONSE CATEGORY
8	STA assets belong to the S-2 since target acquisition is a function of the S-2 shop
4	STA assets belong to the Weapons Company since target detection is for fire support and STA should be with H&S Company assets
2	Weapons Company Commander could make better use of STA than the S-2

C.2.p. *Do you favor creation of a machine gun section organic to the Weapons Company?*

(1) Yes 44% (2) No 44%

C.2.q. *Why/why not?*

Weapons Company should have an organic machine gun section

TALLY	RESPONSE CATEGORY
9	Defensive capabilities for Weapons Company and Battalion CP
4	Benefits of centralized training and control
5	Heavy machine guns are needed

No organic section:

TALLY	RESPONSE CATEGORY
6	Machine guns belong to rifle companies and H&S Co
2	Weapons Company could not support or control the machine guns
1	Enough guns exist in H&S Company

C.2.r. *Do you favor creation of a 106mm RR platoon/section organic to the Weapons Company?*

(1) Yes 56% (2) No 37%

C.2.s. *Why/why not?*

Create a 106mm RR section/platoon in the Weapons Company:

TALLY	RESPONSE CATEGORY
14	The 106mm RR more effective in built up areas and against fortified targets
8	Range, fire and forget capability, supportability

No organic section/platoon

TALLY	RESPONSE CATEGORY
8	Other weapons can do the job
5	106mm RR is too heavy for mobility

C.2.t. *Do you favor creation of an Air Defense section (REDEYE/STINGER) organic to the Weapons Company?*

(1) Yes 47% (2) No 44%

C.2.u. *Why/why not?*

Create an organic air defense section:

TALLY	RESPONSE CATEGORY
11	Ground elements should control air defense, not air units
4	Battalion control would give quicker response and greater weapon saturation
2	Training could be coordinated with the weapons copany

Create no organic section:

TALLY	RESPONSE CATEGORY
9	Task organization of air defense was effective and gives better control
4	Centralized training and maintenance

C.2.v. *Do you favor the addition of any other weapons systems to the Weapons Company?*

(1) Yes 40% (2) No 42%

Specify:

TALLY	RESPONSE CATEGORY
8	TOW In sections of 8 launchers
2	TOW In platoons
2	REDEYE in sections of 8 launchers
2	4.2" mortar in sections of 2 mortars
2	106mm RR in platoons
1	Sections of 8 heavy machine guns
1	Platoons of VULCAN (20mm)
1	Lightweight flame weapon

C.3.(S-1)a. *Is there a need to expand the present "I" Series T/O S-1 section?*

(1) Yes 49% (2) No 26%

C.3.(S-1)b. *If yes explain.*

TALLY	RESPONSE CATEGORY
9	Expand, heavy workload
6	Add CMS, S & C and an additional legal clerk
5	A legal officer
3	Clerks (0151, 0121, 4421)
1	S & C clerk

C.3.(S-1)c. *Is there a requirement for a Legal Section within the S-1?*

(1) Yes 81% (2) No 0%

C.3.(S-2)a. *Is there a need to expand the present "I" Series T/O S-2 section?*

(1) Yes 5% (2) No 72%

C.3.(S-2)b. *If yes, explain.*

Expand S-2 section:

TALLY	RESPONSE CATEGORY
1	With STA platoon
1	With greater analysis capability

C.3.(S-2)c. *Should the S-2 officer, also, be assigned duties as the STA Platoon Commander?*

(1) Yes 47% (2) No 33%

C.3.(S-3)a. *Is there a need to expand the present "I" Series T/O S-3 Section?*

(1) Yes 21% (2) No 60%

C.3.(S-3)b. *If yes, explain.*

Add:

TALLY	RESPONSE CATEGORY
5	Administrative clerks and typists
2	NBC specialists
1	Assistant Operations Chief
1	FSCC personnel

C.3.(S-3)c. *Would you favor shifting the Weapons Company Operations Chief (MSgt, 0369) in the the S-3 Section, and keeping the current Infantry Operations Chief (MSgt, 0369), as well?*

(1) Yes 9% (2) No 70%

C.3.(S-3)d. *Do you favor creation of more NBC Specialists' billets within the S-3?*

(1) Yes 37% (2) No 42%

C.3.(S-3)e. *Do you feel a need for a Topographical Draftsman (LCpl, 1431) MOS within the S-3?*

(1) Yes 58% (2) No 23%

C.3.(S-4)a. *Is there a need to expand the present "I" Series T/O S-4Section?*

(1) Yes 47% (2) No 28%

C.3.(S-4)b. *If yes, explain.*

TALLY	RESPONSE CAEGORY
	The S-4 needs
8	An embarkation officer/S-4A
2	Ordnance officer
1	S-4 chief
1	Maintenance Management NCO
2	The S-4 should be a major (O-4)

C.3.(S-4)c. *Should the S-4 Officer, also, be assigned duties as the Service Platoon Commander?*

(1) Yes 5% (2) No 74%

C.3.(S-4)d. *Why/why not?*

The S-4 should not be assigned duties as the Service Platoon Commander:

TALLY	RESPONSE CATEGORY
22	S-4 overload
	Assign duties to:
9	Supply officer or motor transport officer
6	Embarkation/S-4
1	The S-4 should not have a position subordinate to the Company Commander of H&S Company

C.3.(S-P)a. *Is there a need to expand the present "I" Series T/O Supply Section?*

(1) Yes 5% (2) No 67%

C.3.(S-P)b. *If yes, explain.*

TALLY	RESPONSE CATEGORY
1	Add SNCO for supervision
1	Help in fiscal and warehousing

C.3.(S-P)c. *Is there a need to expand the present "I" Series T/O Transportation Section?*

(1) Yes 28% (2) No 47%

C.3.(S-P)d. *If yes, explain.*

TALLY	RESPONSE CATEGORY
5	More motor transport assets
5	More mechanics

C.3.(S-P)e. *Is there a need for additional vehicular assets organic to the infantry battalion?*

(1) Yes 70% (2) No 16%

C.3.S-P)f. *If yes, what type?*

Add:

TALLY	RESPONSE CATEGORY
10	6 x 6 trucks
8	M880 trucks
3	More tactical mobility
2	Tracked vehicles for 81mm mortar ammo
2	Motorcycles
2	Troop carriers
2	Improved Gamma Goat

C.3.(S-P)g. *Is there a need for additional Infantry Weapons Repairmen within the Armorer Section?*

(1) Yes 49% (2) No 33%

C.3.(S-P)h. *Is there a need for additional Cooks/Bakers within the Dining Facility Section?*

(1) Yes 77% (2) No 5%

C.3.(S-P)i. *Within the Communictions Platoon, is there a need for 14 wiremen?*

(1) Yes 51% (2) No 21%

C.3.(S-P)j. *Would you favor elimination of some Wireman billets in order to create spaces for other:*

(1) Comm billets Yes 21% No 40%

(2) Staff billets Yes 5% No 58%

(3) Weapons-Crew billets Yes 16% No 44%

(4) Riflemen billets Yes 76% No 7%

D. Responderts were given a chance to mention any issues that they felt were most important to the structure of the Marine infantry battalion. There were two single areas of most concern. One recommendation was to return to or maintain the four rifle company structure, and the other cited a need for more antitank guided missiles and specifically TOW at battalion.

Further spontaneous suggestions related to weapons included 106mm RR or REDEYE at Battalion, more DRAGONS in the Battalion or at the company level and improved types of weapons such as M202, LAAW, machine guns and infantry rifle.

Other desired changes to the battalion were to reinstate company administration, irease battalion mobility, increase maintenance, man the battalion at T/O levels and stabilize billets.

TALLY	RESPONSE CATEGORY
13	Return to or maintain four rifle companies
12	Need more anitank guided missiles, specifically the TOW
8	Increase battalion mobility
7	Improved types of weapons
6	Reinstate company administration
5	Stabilize billets
4	REDEYE
3	106mm RR
2	Better maintenance

V. MILITARY JUDGMENT

Introduction

The Infantry Battalion Study Advisory Panel was formed in October 1979 and consisted of sixteen officers from Headquarters, U.S. Marine Corps and the Marine Corps Development and Education Command. Members of the panel included experienced infantry officers plus an aviation, a communications, and an artillery officer. This committee met for two hours weekly to discuss and provide insight into certain characteristics of infantry battalion structure. Meetings were as unstructured as possible to maintain the panel meeting room as a forum for the free exchange of ideas. Appointed members of the Infantry Battalion Study Advisory Panel were:

Colonel Dallas R. WALKER	HQMC (MPC)
Colonel Joseph E. HOPKINS	MCDEC (OCS)
Colonel Walter R. LEDRETTER, Jr.	MCDEC (LID)
Colonel William R. BALL	MCDEC (CSC)
Colonel Arthur P. FINLON	MCDEC (COS)
Colonel Ernest T. COOK, Jr.	MCDEC (TBS)
Colonel Michael D. CERRETA, Jr.	HQMC (OTOR)
Colonel Robert J. MODRZEJEWSKI	HQMC (OTOG)
Colonel Gene A. DEEGAN	MCDEC (CSC)
LtCol Leonard J. SZAFRANSKI, Jr.	MCDEC (SAID)
LtCol Patrick G. COLLINS	HQMC (OTT)
LtCol James H. R. CURD	MCDEC (CSC)
LtCol Walter M. FITTS	MCDEC (CSC)
LtCol Robert J. O'BRIEN	HQMC (RDS)
LtCol Robert J. MASTRION	HQMC (LPP)
LtCol James R. FURLEIGH	HQMC (OTOG)

Viewpoints of panel members, as expressed in brainstorming sessions, enabled the study team to consider practical as well as quantitative matters. The considerable amount of individual

and collective experience of the panel members brought into focus several factors which could be better appreciated from real life than from analysis. As the panel reached conclusions in its several deliberations, a number of substantially intangible topics, such as Marine air-ground synergism and the worth of leadership, began to assume dimension and substance. As a result, the professional judgments of the panel members took on the property of a "yardstick of experience." The measurements which resulted from this yardstick are stated in this section of the report. The following topics were discussed and are summarized in the remainder of this section; a modified point paper format has been used.

- Anti-air capability for the infantry.
- Weapons systems available to the infantry battalion.
- Maneuver capability of the infantry battalion.
- Battalion level command and control considerations.
- Development of a battalion model (candidate structure).
- Delphi process to determine tradeoff values.

Although a consensus was not reached on every subject discussed, the discussions themselves were extremely valuable, and arguments both for and against each issue were surfaced and considered.

Ground Air Defense

- *The Issue*

The projected threat for the near future changes the complexion of the battlefield. The infantry battalion has,

for many recent years, operated on and planned for a two dimensional battlefield. As the probablilty of encountering enemy close air support, especially rotary wing close air support, increases to the level where it is nearly a certainty, the battalion commander's plans must include a third dimension, that of countering enemy air in the vicinity of the FEBA. As a result, the need for forward area air defense (FAAD) will be more vital in the eighties than it has been in the immediate past.

- *Discussion*

Current forward area air defense techniques allocate sixty percent of our total FAAD assets to provide support to ground forces; the remaining forty percent are retained for point defense of certain aviation assets. Responsibility for control of these assets has traditionally and doctrinally been placed with the aviation component; logically, therefore, the assets also have been physically placed with aviation.

Some members of the advisory panel questioned the propriety of locating FAAD within the aviation umbrella. This comment was based on the observation that air defense for the infantry is not really a part of the anti-air warfare function of Marine aviation since the primary function of infantry air defense is to guarantee the commander's scheme of maneuver options. Although this particular discussion did not lead to a consensus, it did produce agreement that the air threat to the infantry is

sufficiently grave that a more responsive scheme for infantry air defense is needed.

The introduction of increased air defense assets in support of ground combat elements does not mean that air defense assets in support of aviation should be reduced. Instead, it implies an increase in the total air defense inventory. The panel also concluded that this increase in quantity of weapons, plus a reallocation of assets to go with it, would not have to impose deleterious effects on air defense command and control procedures. Physically locating some air defense assets where they can be most responsive, i.e., available to ground combat commanders, would not demand a concomitant change in the control of those assets. Stated in other terms, the air defense function is primarily a control function as presently envisioned, and the physical redistribution or modification of assets need not alter that situation. Figure V-1 is a characterization of the anti-air warfare function of aviation as a command and control relationship. The physical location of assets does not by necessity change this environment.

The ground air defence requirement includes two kinds of threat: rotary and fixed wing. The nature of the fixed wing threat suggests the need for surface to air missiles but the rotary wing threat could be countered by a dual purpose weapon system. The panel expressed considerable concern that the introduction of a single-purpose, i.e., REDEYE or STINGER,

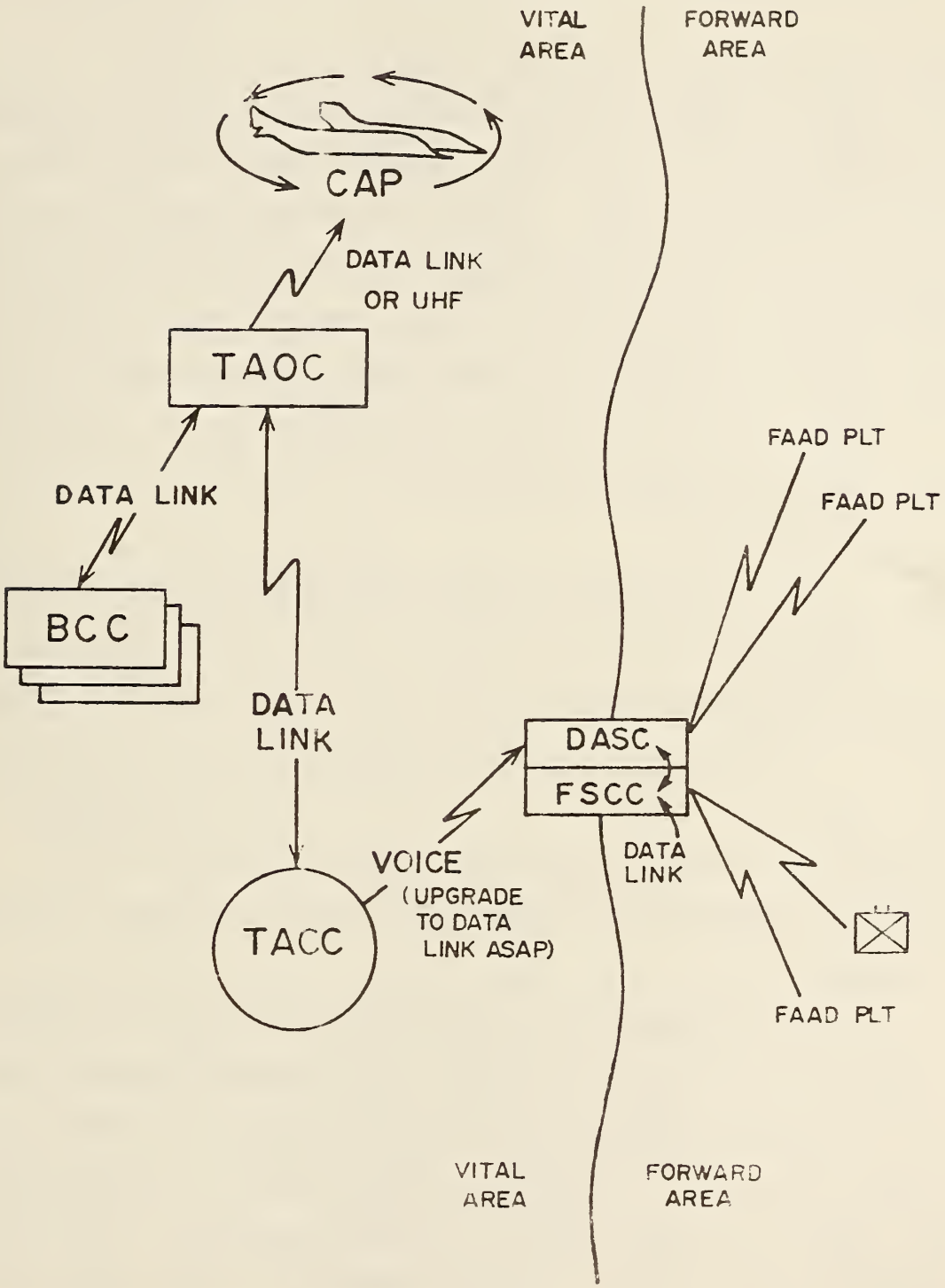


Figure V-1 - Air Defense Environment is Characterized by Command and Control Aspects

air defense weapon to the infantry arsenal would be an expensive alteration, since the air threat, although grave, was only a part-time danger. It was considered much more practical to add a multiple-purpose weapon that had the capacity to engage rotary wing aircraft as needed, and be able to provide fire support to infantry elements when not being used in an air defense role. The .50 caliber machine gun was discussed as a possible weapon of this type.

- *Conclusion*

The need for more responsive and more plentiful ground air defense assets is significant. These assets must be allocated to ensure immediate fires to defeat or discourage the use of enemy air in the vicinity of the FEBA. The nature of the command and control, training, and logistics aspects of a dedicated ground air defense capability is such that the infantry battalion is not the most appropriate agency for its placement.

The panel suggested that (a) *the weapons of the infantry battalion be expanded to include a multi-purpose weapon capable of engaging rotary wing close air support,* and that (b) *additional ground air defense systems capable of countering the enemy fixed wing threat be located somewhere in the Marine Division other than the infantry battalion.* This topic has been passed to the study team now examining overall Marine Corps force structure, requesting that they examine it in this light.

Infantry Weapons

- *The Issue*

Infantry organizations are charged with several tasks, including actual closure with an armed opponent. In this arena of close, even personal, combat the infantryman's weapons are significant. In recognition of this substantial relationship linking infantry organizations to infantry weapons, the panel spent a large amount of time in weapons-centered discussions. The aim was not to alter the scope of the study, but rather to ensure that the infantry battalion's link to infantry weapons was as strongly and effectively forged as possible. This was considered especially vital in view of the smaller number of personnel assets in the new battalion. All panel members sensed a strong need to furnish firepower increases to offset manpower decreases. The organization could then be structured around the firepower skeleton.

- *Discussion*

Of overriding importance to the panel was a consensus that U.S. Marine infantry must remain light infantry. Although we can achieve surprise and extremely rapid mobility through helicopter support, and can become mechanized through support or proven Marine task organization principles, we also need the flexibility, deployability, and stubbornness that are the hallmarks of footmobile organizations. In weapons selection, then, force designers must not degrade this footmobile

capability. While nearly all agree that some weapons heaviness should be provided to compensate for personnel reductions, the panel's design philosophy emerged as one of adding weapons punch, but retaining footmobility. No matter how attractive some systems might have been to panel members, they were often ignored due to logistics, mobility, or maintenance factors which were inconsistent with that approach.

Weapons systems other than for air defense were discussed at length. The main points of the panel's deliberations are summarized in the following segments, entitled: Small arms, Assault and Anti-Armor Weapons, and Indirect Fire Weapons.

•• *Small Arms*

Panel members expressed concern in three areas: (1) recent problems with today's small arms, (2) apparent superiority of Soviet/Warsaw Pact small arms, and (3) the absence of dramatic improvements through the eighties.

The first area of concern centers on the reliability of M16 rifles and M60 machine guns. Characteristic of the panel discussions are the results of a Third Marine Division field evaluation of both weapons which was performed during July 1979. Figure V-2 highlights the outcome. Since this is only one isolated example of a live fire assessment of today's small arms weapons, it can not be used independently to justify conclusions as to the adequacy or inadequacy of the weapons. It can, however, be used in conjunction with the experiences

LIVE FIRE TEST OF SMALL ARMS			
Weapons Available by Type		M16	M60
		316	24
Results of Limited Technica Inspection	Good-Fair	287	2
	Poor	29	22
Live Fire Test Results	Pass	258	0
	Fail	29	2
Failure Recap	Total	58/316	24/24
	Percent	18.3%	100%

Figure V-2 - Field Test of M16 and M60

and impressions of the panel members to signal concern. This worry is compounded by the fact that solutions to the problems indicated by figure V-2 are being pursued in terms of product improvements rather than new technology to introduce replacement weapons.

Although actual performance data similar to that shown above was not available for Soviet/Warsaw Pact weapons, the panel was able to make general comparisons in sufficient detail to allow limited conclusions. Of obvious concern was the reliability factor, since Soviet small arms are designed to emphasize high reliability (at a cost of greater weight). With reliability problems such as were indicated by the Third

Marine Division's firing test, Soviet superiority in small arms matchup would be relatively assured.

Resulting from their concern over the reliability problem, and coupled with the lack of range stand off distance associated with today's weapons (especially the M16 rifle), the panel members agreed that infantry battalion structure for the eighties must allow for incorporation of both range and reliability improvements. Specific considerations are reviewed below.

●●● The .50 Caliber Machine Gun is presently available in sufficient numbers to immediately equip the infantry battalion with a durable, long-range automatic weapon. The weight of present .50 caliber weapons is somewhat greater than the panel's design philosophy would suggest, but discussion showed the tradeoff to be acceptable. In exchange for extra weight, the infantry battalion could gain additional capability to defeat light armor through the use of the .50 caliber saboted round. Furthermore, the personnel spaces used for .50 caliber machine guns would serve as a structure hedge to allow future introductions of the Mark 19 machine gun which would provide extra anti-armor punch although at a lesser range. The panel concluded that some *.50 caliber machine guns should be added to the infantry battalion arsenal to provide greater range, heavier small arms firepower, and a limited (rotary wing) air defense capability.* These weapons would be controlled centrally but could be attached to maneuver elements as dictated by the tactical situation.

●●● Another already available weapon is the sniper rifle. In the hands of a skilled and well-trained marksman, this weapon could be used to improve our side of the standoff equation. The traditional employment of this capability has been in a dual purpose mode: the scout-sniper. The panel discussed the contributions and drawbacks of the scout and sniper roles individually, as well as the familiar scout-sniper combination. A representative from the Scout-Sniper School, Weapons Training Battalion, MCDEC participated in a portion of these deliberations.

The contribution of the sniper to the infantry battalion's firepower centers around range and accuracy. A fairly significant portion of the value of small arms fire is suppressive (as a base of fire). Sniper augmentation to normal small arms bases of fire would enhance the suppressive value of the other less accurate weapons by adding enough well-placed shots to increase the effect on the target; snipers would not have to be physically sited with the unit serving as the base of fire to be employed in this capacity. Sniper accuracy would also provide the battalion with a capability to deliver small arms fires through embrasures in bunkers, against selected key targets, e.g., leaders, crew-served weapons gunners, tank commanders, communications personnel, and enemy snipers, and to mark targets with tracers for other direct fire weapons, e.g., tanks. The precision fire of the sniper-trained marksman would

also add capabilities, including the employment of saboted rounds against lightly armored targets.

In spite of these contributions, the panel observed that employment of a Marine as a sniper is only a part-time use of assets. This led to consideration of the scout aspect. A scout provides a close-in organic reconnaissance capability to enhance the battalion's capacity to gather and process combat intelligence. The scout is a trained observer who understands the use and nature of terrain. Basically an independent operator, once assigned a mission, the scout frequently functions forward of the FEBA as an extension of already established observation and listening posts. The need for reliance on acquired skills such as, undetected movement, personal camouflage, and disciplined systematic observation make the scout's function somewhat dependent on the tactical situation. The panel agreed that the most effective organizational placement for scouts is within the battalion S-2 section.

Discussion of the scout role and the sniper role, in conjunction with the panel's concern over reduced personnel assets, led to a conclusion that retention of the traditional scout-sniper combination would be preferable to specialization. Specialized scouts or snipers would require the dedication of manpower resources to billets which would be utilized only part-time, i.e., as the tactical situation permits. This factor is compounded by several drawbacks associated with the

character of scouts/snipers/scout-snipers. By its nature, the sniper team dedicates two Marines to a system which furnishes only a very slow (although precise) rate of fire. The number of casualties produced by snipers are probably not of sufficient number to influence the outcome of a small arms engagement solely by virtue of attrition. The promise of 90% certainty of a first round kill on a stationary target at 1,000 yards, on a moving target at 800 yards, and on an armored target, e.g., tank commander, at 600 yards is attractive but has a price tag. Namely, optimal employment of snipers is restricted to situations and terrain which permit their use without limiting the battalion commander's other fire support options. The presence of a scout or sniper stalking forward of the FEBA requires that restricted fire measures be put into effect for safety reasons. These measures illustrate the tradeoff situation: the use of scouts/snipers in certain circumstances reduces the usefulness of artillery or other fire support. This point adds further impact to the panel's observation that scouts/snipers are part-time functions.

In recognition of these various factors, the advisory board concluded that scouts and snipers must have other roles as well. Employment includes command post security, various functions within the S-2 section, watchstanders, and even use on command post working parties. Furthermore, they should be retained as scout-snipers, with scouting a more prominent role.

Placement at levels lower than battalion makes the sniper function more responsive in support of small unit leaders, but will tend to degrade the training, and utility of the scout function in intelligence support.

In summary, the panel concluded that *the extended range, accuracy, and minor anti-armor value of the sniper should be added to the infantry battalion, but that this capability should be a secondary role to that of the scout.* Furthermore, the most likely placement for the *scout-sniper teams should be within the battalion S-2 section*, and not a subordinate element of the Weapons Company.

●●● *Squad Automatic Weapon (SAW)*

The panel's consensus on the SAW was that whatever weapon is selected, it should be procured as rapidly as possible. *Structure is currently adequate* for immediate introduction of the SAW into the infantry battalion as a replacement for the automatic rifleman's M16A1. This will be a firepower improvement.

●● *Assault and Anti-Armor Weapons*

The primary conclusion of the advisory panel, in terms of assault weapons, can be expressed as grave concern over the lack of a suitable organic assault system. Much discussion centered on this topic, with suggestions ranging from the value of rearming with the 3.5 inch rocket launcher to the viability of acquiring the lightweight, portable 90mm recoilless

rifle as in interim solution. Although several specific weapons were discussed, there was little consensus on the feasibility of any one over others. The basic focal opinion was that *an assault weapon of some type should be acquired as rapidly as possible.* The panel was firm that *some structure spaces should be identified* during this study of infantry battalion organization to minimize delay in the addition of an assault system to the battalion's repertoire once a suitable weapon becomes available.

In the area of anti-armor weaponry, some concern was raised on the issue of centralized versus decentralized control of anti-armor assets. Several factors, including the costs of training and training devices, the complexity of system maintenance due to a high degree of sophistication (relative to most infantry weapons), the sheer practicality of centralized training, and the fact that decentralized employment of DRAGON did not seem in consonance with current doctrine, indicated that anti-armor assets should be located and employed in a centralized fashion.

The density of DRAGONs throughout the eighties was considered adequate in that current plans will provide 32 systems per battalion. The fact that 16 of these were to be equipped with day trackers and 16 with night trackers was not identified as a problem, except to suggest a "more-is-better" concept which would place a greater number in the arsenal but

not necessarily in structure. This reserve of DRAGONs would tend to safeguard employable levels. It was suggested that some added DRAGONs could be placed in the rifle companies temporarily, both to preserve structure into which an assault weapon could later be assimilated, and also to initiate planning and programming actions necessary for any increase of battalion DRAGON density to levels greater than those already envisioned.

Although significant firepower increases could be realized by incorporating TOW into the infantry battalion, the factors which favored centralization of DRAGONs operated even more strongly to favor continued centralization of TOW assets.

•• *Indirect Fire Weapons*

The contribution of mortars to the infantry battalion placed highly on the panel's list of important values. A consideration that prompted much discussion was that the ranges of both the 81mm mortar and the 60mm Lightweight Company Mortar System made those weapons indispensable to the infantry battalion. As figure V-3 implies, if organic and supporting (less air) weapons were all fired from the same position on a FEBA, there would be a range from about 1100 meters to about 2000 meters into which indirect firepower would be very light. Specifically, except for the 4.2 inch mortar (not in the active inventory) and the M101A1 (105) howitzer (being phased out), the only indirect firepower available to the infantry

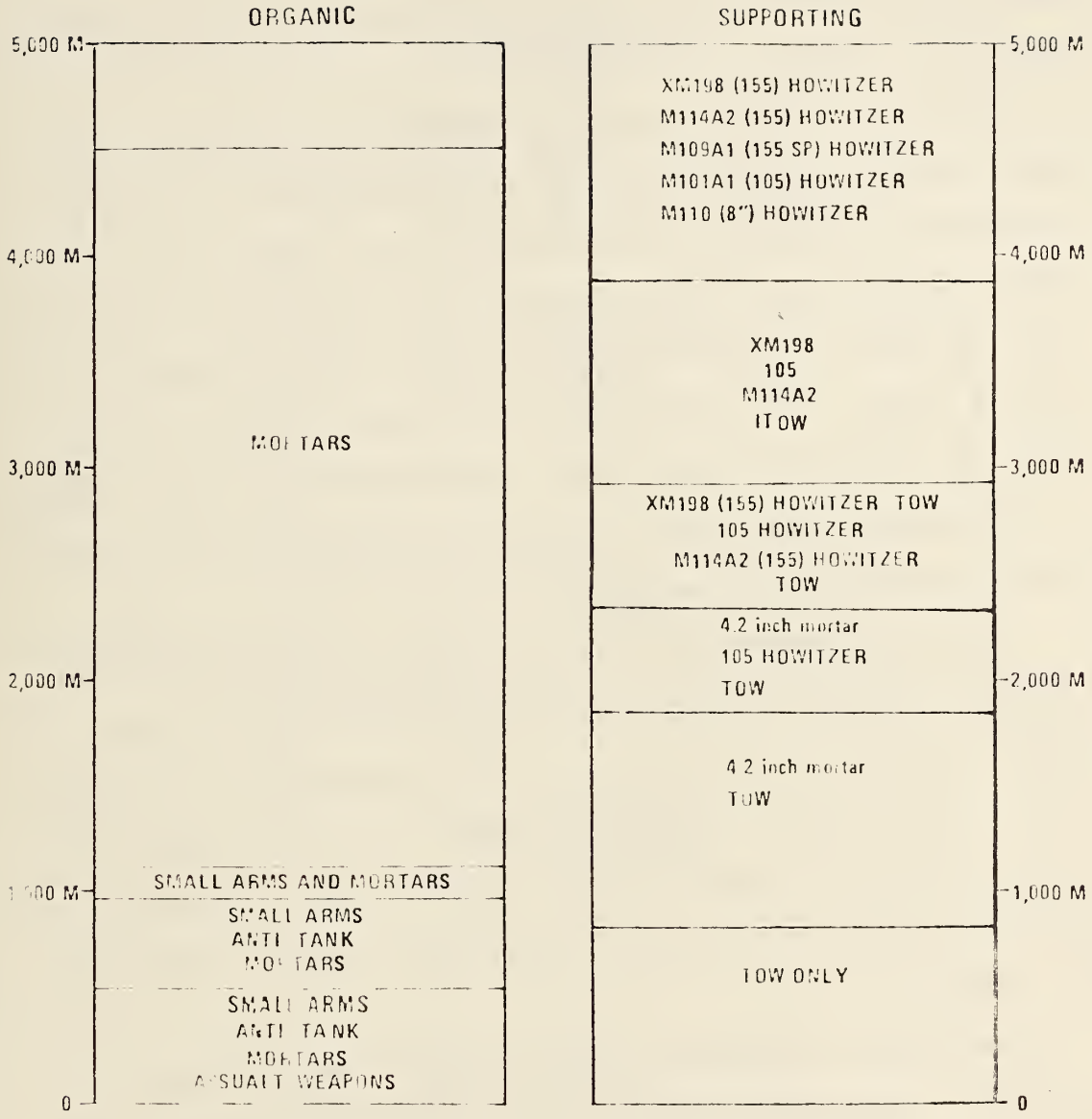


Figure V-3 - Ranges of Organic and Supporting Arms (less air)

battalion would have to be provided by the battalion's organic mortars as figure V-4 highlights.

The panel also discussed the threat, as described elsewhere in this report, as requiring as much mortar firepower as possible. One observation was that the ranges of anti-armor weapons now in the inventory, and those being developed, allow extended standoff distances between armored targets and the FEBA. This fact might force enemy infantry to dismount at distances greater than traditional small arms ranges, and they then become ideal targets for indirect fires by both organic and supporting weapons.

The panel recommended that there be *no reduction in the number or size of the infantry battalion's organic mortar assets*. In fact, they favor the close examination of systems such as the Tampella Lightweight 120mm Mortar, currently in use by the Israeli Army and some NATO forces. If adopted, the Tampella could furnish greater range and lethality than present assets.

Recognition of the fact that the 81mm mortar platoon is relatively expensive in terms of personnel caused much discussion. The question of manning promoted consideration of mixing the mortars at battalion level between 81mm and 60mm systems. The panel did not feel that the creation of such a hybrid organization was sound, even if lethality and range capabilities could be preserved, with fewer personnel. The

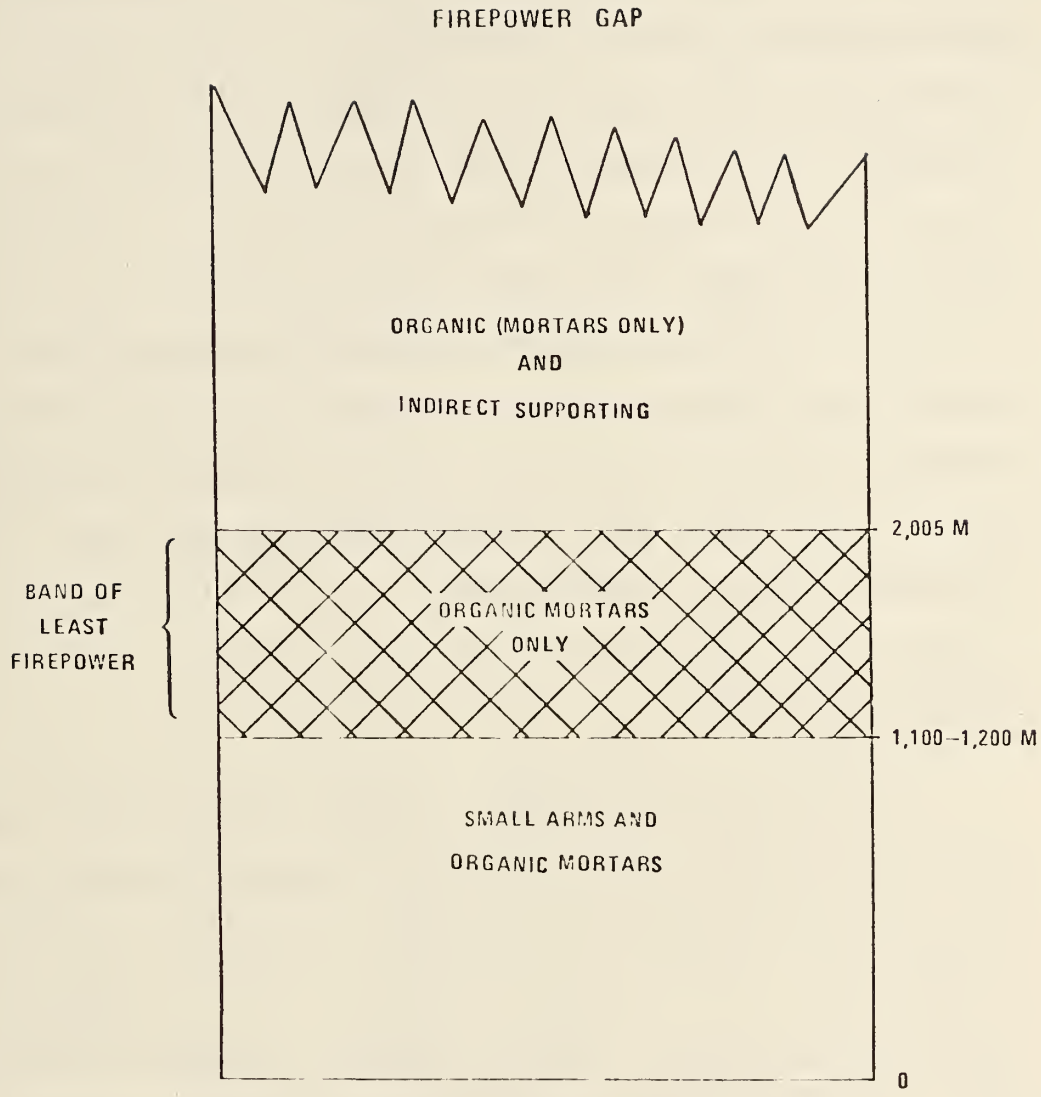


Figure V-4 - Band of Least Firepower

preferred approach was to retain a pure 81mm mortar (perhaps even a Tampella) platoon at the battalion level, and to man it with sufficient personnel to fire with the entire platoon, but to displace only one-half of the unit at a time when foot movement was the only means of available mobility. This approach would require fewer crew members than have been authorized (but not always available, several panel members pointed out) in the past but would tie battalion mortars to the availability of helicopter support in marginal terrain; this could degrade firepower in cases where mobility means were not available, or in situations requiring footmobility.

Maneuver Capability

- *The Issue*

In addition to firepower, combat power requires the ability to maneuver organizations and weapons systems to capitalize on the principles of war, e.g., massing of firepower, as appropriate. This maneuver capability, when broken down into its base elements, requires mobility means and organizational structure, both slanted towards optimizing maneuver. In terms of mobility, the infantry battalion relies on a combination of organic and supporting assets; in terms of organization, the infantry battalion relies on its major organic maneuver elements, the rifle companies. The current (interim) battalion organization contains three maneuver elements, although permanent structure calls for four. his introduced a

fundamental question for the panel to consider: "What is the most effective number of rifle companies, three or four?"

• *Discussion*

Much of the initial discussion centered on the panel's disagreement with the 900-man strength cap which constrained the study effort. Inasmuch as a strength reduction prompted the adoption of the present interim structure (three rifle companies), the panel's dissatisfaction was interpreted as a loose statement of preference for a four company structure. This preference was not adequately firm, however, to allow the formation of conclusions, so several broad themes were used to facilitate further deliberations on this topic:

• Since battalion size is constrained, company sizes for a four company structure must logically be smaller than company sizes in a three company structure.

• Combat support external to the battalion remains unchanged, e.g., there is no additional artillery support to compensate for the loss of maneuver capability which occurs when one rifle company is deleted from the familiar four company structure.

• A three company battalion with the same organic fire support as a four company structure enjoys a greater density of (organic) supporting fires.

• Although three rifle companies are undoubtedly easier to control than four, the familiarity of today's Marines with the four company structure lessens the impact of that consideration.

The panel discussed the future threat, which indicated that the battlefield for an intense infantry engagement will be characterized by mobility, nearly continuous operational activity, and the application of extremely lethal and accurate supporting arms fires. Naturally, there is the distinct likelihood that Marine infantry battalions will be employed in less intense environments but even these will be dominated by mobility and accurate firepower. A unit, once engaged, will not be able to break contact easily, and battles may continue for as long a period as is necessary until one side or the other is defeated. This consideration favored more and smaller maneuver elements to make available both a larger portion of uncommitted combat power and/or a more significant reserve capacity. Figure V-5 compares a battalion with four smaller companies against one with three stronger companies, to illustrate the basic relationship identified by the panel.

NUMBER OF RIFLE COMPANIES IN CONTACT	PORTION OF COMBAT POWER AVAILABLE FOR MANEUVER		COMPANY SIZED RESERVE CAPABILITY?	
	3 COMPANY BN	4 COMPANY BN	3 CO. BN	4 CO. BN
ONE	67%	75%	YES	YES
TWO	33%	50%	YES	YES
THREE	-0-	25%	NO	YES
FOUR	N/A	-0-	N/A	NO

Figure V-5 - Comparison of Availability of Maneuver and Reserve Elements

Another characteristic of modern battle will be its continuous nature. This feature demands at least one responding structure consideration, namely, that the infantry battalion be organized to permit maximum application of combat power with the concurrent capability to rest a portion of the force. Again, the four company structure was preferred in that it permits the employment of 75% of a battalion's combat power in an effective manner while also providing the flexibility to rest one organic maneuver element.

Although the four company option was clearly favored, the panel also expressed reservations about the size of each company. With reduced battalion strength divided equally four ways (after deducting a portion for the H&S and Weapons Companies) instead of only three, rifle company sizes had to be less, thus degrading the amount of staying power and combat power available to meet the demands of high intensity warfare. This reservation created a dilemma, namely, four maneuver elements were preferred over three, but larger maneuver elements were preferred over smaller ones.

Discussions then shifted to consideration of this dilemma. Several panel members performed an informal functional analysis, by considering the variety of roles in which a maneuver element, i.e., rifle company, could be employed. The primary function was to provide fire and maneuver, but others could not be overlooked. An illustrative list follows:

- Flank and rear area security
- Screening
- Reconnaissance
- Reserve
- Weight main attack
- Conduct supporting operations
- Serve as infantry component of a mechanized combined arms task force
- Deny key terrain or protect vital facilities
- Provide fire and maneuver

With the exception of the last two roles listed above, rifle company size was not really a dominant feature. Other characteristics than size were recognized and, in fact, some of the roles appeared to be classical cavalry functions, i.e., performed traditionally by a force with great mobility, but frequently limited in size. In other words, although the ability of the infantry company to execute some of its functions might be degraded by an organizational strength reduction, other functions, such as, reconnaissance, weighting the main attack, and operating as part of a mechanized task force, were not sensitive to company size. This prompted a suggestion that the battalion could contain maneuver elements of different, rather than mirror-imaged, configurations. Smaller, less potent elements could perform functions not demanding heavy personnel strengths, thus permitting an increase in the size of the elements most likely to engage in high intensity operations.

• *Conclusions*

A departure from the longstanding tradition of mirror-image rifle companies, although somewhat penalizing the battalion in terms of flexibility, will allow the retention of four maneuver elements within the reduced organization. By using two different sizes of maneuver elements, there is a reduced capability for fire and maneuver. For this reason, a mix of three larger and one smaller elements is preferable to a two-two mix. Although the panel would prefer four fully capable rifle companies, it favors a mix of three rifle companies and one smaller infantry unit over three stronger rifle companies. Furthermore, since the smaller unit is the logical element to perform security and since task organization, e.g., as in a MCATF, rules, it is best located in the Weapons Company where it is convenient to supported units, the battalion command posts, and the weapons systems with which it will be reinforced for a number of its tasks.

The advisory panel suggested that (a) *the battalion structure contain three rifle companies and one small, maneuverable infantry element;* (b) *the smaller infantry unit be located as a subordinate element within the Weapons Company;* and (c) *the smallest element be assigned tasks not of an organic firepower or personnel-intensive character.*

Command and Control (C^2)

• *The Issue*

The infantry battalion's command and control requirements center around very fundamental operational functions, such as, maneuver, fire coordination, and logistic support. The system by which C^2 has been exercised is battle-tested and successful. As a result, the main factors for concern are the effects of technological developments and structure changes, on the already proven C^2 system of the infantry battalion.

• *Discussion*

•• MTACCS

Technology's greatest impact on all aspects of command and control, including that within the infantry battalion, will be in the form of the MTACCS. The panel considered MTACCS in considerable detail and tried to balance the promised improvements against what appeared to be associated problems.

Two immediate advantages of MTACCS systems will be a weight reduction and more rapid passage of information. The panel showed concern on both counts, however.

The MTACCS weight savings are clearly seen at the top, but not at the individual item level. The infantry battalion will need power sources not presently required. This factor alone, will serve to reduce mobility in that generators, generator personnel, and redundant equipment must all be added

and this is further compounded by an impression that MTACCS components do not include prime movers. In other words, on-road mobility will cause a drawdown in terms of available surface mobility means, and off-road mobility may well serve to degrade helicopter lift capacity now available for other items and personnel.

In terms of realtime processing of information, the panel was doubtful as to the degree of improvement that would actually occur in the infantry battalion, and also felt that the need for equipment redundancy was crucial. Thus, the added equipment necessary to preserve the rapid processing capability by ensuring adequate backup was undesirable from a logistics standpoint. Even PLRS, a system which received some popularity, was considered a liability in the sense that maintenance of a backup capability was still required.

Discussion of personnel savings resulted in much the same conclusion as did the previous consideration of component weights. Namely, personnel savings accreditable to MTACCS would be realized in organizations other than the infantry battalion. The likelihood that future systems would exact a need for personnel with higher skill levels than the infantry battalion's technicians presently possess signalled to panel members that MTACCS might actually create, rather than relieve, personnel difficulty. At least as far as the infantry battalion is concerned, MTACCS was not felt to be beneficial from the manpower standpoint.

Another fear of the panel can best be categorized as one based on the battalion's fundamental orientation. That is, the infantry battalion is not a systems-intensive organization, at least not in the sense of C^2 systems. The infantry battalion tends to be a person-intense, or perhaps firepower-intense, structure which has been traditionally characterized by very simple (even primitive in some cases) means for command and control. To raise the sophistication of the command and control function as drastically as MTACCS could do might also tend to alter the battalion's basic orientation. Simply stated, a number of panel members argued strongly that the Marine infantry battalion can not afford the added manpower, the reduced mobility, the logistics drain, and the potential reorientation that MTACCS could cause.

The infantry battalion's backup system in the event of MTACCS failure will most likely be the present system. This will require continuation of land navigation and other training now required for command and control. This fact suggests that the need for MTACCS at the infantry battalion level is less than at higher levels. It also suggests that the sophistication of MTACCS might best be used at the lower level to improve the basic capabilities which are the weakest parts of the present system. This would place the greatest benefit and the greatest penalty of MTACCS at higher levels, better able to cope with both. The advisory panel concluded that *no infantry*

battalion structure spaces should be specifically identified for MTACCS implementation at this time, but that a separate, detailed evaluation of each subsystem in terms of the points discussed above should be made to estimate the utility of each to the infantry battalion.

•• Fire Support Coordination

The focal point for discussion of fire support coordination within the infantry battalion is the staff member primarily responsible for that function--the fire support coordinator (FSC). The panel considered the need for an officer billet to be specifically identified as the FSC.

There was an initial trend favoring the assignment of the Weapons Company Commander as the FSC, and even to require the designation on the table of organization of an artillery officer (MOS 0802) as the Weapons Company Commander. Preference for assignment of an artillery officer diminished throughout the discussion, however, as the following points were developed:

- Since combat stresses on the FSC are significantly greater than training stresses, some battalion commanders fortify that billet by assigning a very strong officer.

- By designating the Weapons Company Commander as the FSC, the battalion commander's prerogative to strengthen the FSC could be exercised in an orderly manner, by assigning a very strong officer as the Weapons Company Commander.

- If, however, the Weapons Company Commander's billet was designated as an artillery officer's, the battalion

commander's prerogative would be considerably lessened in that he would be forced to accept the only available (or, at best, one of two) artillery officer, rather than selecting among dozens of infantry officers.

- The position of the panel was that the assignment of the Weapons Company Commander as the FSC is a logical and beneficial course of action. The assignment of an artillery officer as the Weapons Company Commander, though, is overly restrictive, tends to usurp commanders' prerogatives, and makes the quality of the FSC a matter of chance rather than selection; for these reasons, it is not recommended.

Another matter of concern to the panel was the size of the FSCC. The need for more frequent displacements, continuous operations under stressful conditions, and the probable requirement for faster decisions on the modern battlefield all combine to create a strong requirement for depth in the FSCC.

Part of this depth can be provided by designating the Weapons Company Commander as the FSC. This action provides an extra officer for the FSCC in that the Artillery Liaison Officer is still required within the battalion even though someone else may be the designated FSC. The presence of two officers with experience and training as FSC's would greatly enhance the battalion's fire support coordination during displacements, would ensure more opportunity for the FSC to rest during continuous operations thereby promoting greater efficiency,

and would provide extra FSC capability during peak periods. Since the FSCC hornet's nest may be even busier in the future than it has been in the past, this latter capability to coordinate multiple missions with speed and accuracy becomes more important than ever. Although MTACCS promises to be of assistance in this area, the responsibility for proper coordination will still require a Fire Support Coordinator.

Panel members recognized that there is a clear need for Fire Support Coordinator training, especially for infantry officers (i.e., those assigned as Weapons Company Commanders). Although local programs have been developed within the Fleet Marine Forces, and the panel was cursorily briefed on one of them, there would be value in incorporating an FSCC procedures package into the programs of the Basic School and Amphibious Warfare School, if such curricular changes could be accomodated.

In summary, the panel recommended that (a) *the Commanding Officer, Weapons Company, continue to serve as the Fire Support Coordinator;* (b) *the Weapons Company Commander be an infantry officer;* (c) *the Artillery Liaison Officer provided by task organization be retained as an integral adjunct to the infantry battalion command and control structure;* and (d) *formal Fire Support Coordinator training programs be developed as possible and practical.*

Determination of Trade-off Values

- *Design Philosophy*

The utility of value judgments is often questioned based on the claim that such opinions are nebulous or arbitrary. While there is substance to this appraisal of the intangible nature of opinion, expert or not, there is also conflicting evidence that opinions (if carefully gathered and analyzed) can be used to form valid conclusions.

The principal purpose in forming the Study Advisory Panel was to gather a body of (infantry battalion) experts from whom mature and experience-based opinions could be elicited. The major product of the panel's deliberations was to be a set of weighted values (utility judgments of sorts) for the main infantry battalion design features. Thus, it was important that a generally accepted method for determining group opinion be used. One such method, the Delphi technique, was selected based on its demonstrated feasibility as a tool for eliciting and processing value judgments. Further, the Delphi process met with some degree of acceptance among various decisionmakers and analysts, so long as three tests were satisfactorily met:

(1) Individual opinions were within the realm of reason, and not merely capricious or argumentative.

(2) After feedback, some degree of convergence into a group opinion was exhibited in second or subsequent rounds of opinion gathering.

(3) A reasonable amount of group reliability was demonstrated. For example, two similar groups of experts would *tend to* prioritize several items in *about the same* relative sequence.

The maturity and professionalism of the study advisory panel members assured fulfillment of the first criterion. The second and third tests were also satisfied, one by dividing the study panel into two groups based on random, after-the-fact selection, and the other was achieved through questionnaire iteration accompanied by feedback and discussion. The general process was as follows:

(1) All members responded to a questionnaire.

(2) Questionnaire results were reviewed and analyzed by a statistician.

(3) Results were then presented to the panel and outlying, or divergent, opinions were highlighted.

(4) After brief discussion of rationale for outliers, members were permitted to adjust their original questionnaire responses, if they so desired.

(5) Persistent outliers were discussed again as desired, and an opportunity to readjust responses was afforded (no member made any further adjustment).

The questionnaire which was used for opinion gathering structured twenty-five questions around the three most fundamental infantry functions: shoot, move, and communicate. Design attributes were identified within each of the three

fundamental functions and, through the Delphi tool, these were then arranged in order of their perceived value to the battalion. A prioritized list of attributes was developed for each of the two groups. The similarity in ordering of tne two lists lent credence to the validity of the Delphi approach in this instance, and also made the aggregation of the two lists into a single list a simple task. By using the arithmetic means of the frequency of responses to the various questions, weighted scores of the relative value/utility of one attribute relative to others in its category were developed. Essentially, those attributes with index values closer to 1.0 were considered more desirable than those with lower values. These scores were then used to assist in tradeoff recommendations to be developed later, as necessary.

Figure V-6 shows the advisory panel's impressions as to the relative importance of the evaluated factors. Additionally, the score column is useful in estimating distribution of personnel between the various elements. A category weighting technique could have been used to aggregate the attributes into one master list. This was not done, though, because the purpose of the effort was only to aid tradeoff decisions within each category. Since it was always the intent of the study team to include some capability from each category in the final structure, there was no need to further refine the weighted values.

CATEGORY	ATTRIBUTE	ELEMENT	SCORE	TRADEOFF STANDING
FIREPOWER (shoot)	SMALL ARMS	SQUAD AUTO WPN	.46	1
		LIGHT MACH GUN	.37	2
		HEAVY MACH GUN	.17	3
	SUPPORT WEAPONS	ANTI-ARMOR	.26	1
		LIGHT MACH GUN	.26	1
		LIGHT MORTAR	.20	3
		HEAVY MACHINE GUN	.16	4
		HEAVY MORTAR	.12	5
	UNIT TYPE	RIFLE SQUAD	.45	1
		MACH GUN SECTION	.35	2
		ASSAULT SECTION	.10	3
		LIGHT MORT SECTION	.10	3
MANEUVER (move)	NUMBER OF MANEUVER ELEMENTS	FOUR MANEUVER ELMS	.57	1
		THREE MANEUVER ELMS	.29	2
		FIVE MANEUVER ELMS	.14	3
COMMAND AND CONTROL (communicate)	COMMUNICATIONS ORGANIZATION	RADIO	.46	1
		WIRE	.21	2
		TAC AIR CONTROL PARTY	.20	3
		MESSAGE CENTER	.13	4
	ORGANIZATION FOR LOGISTICS SUPPORT	S-4	.30	1
		SUPPLY	.20	2
		MOTOR TRANSPORT	.19	3
		MAINTENANCE MGT	.14	4
		ARMORY	.09	5
		EMBARKATION	.06	6
		SUBSISTENCE	.02	7
	ORGANIZATION FOR NBC DEFENSE	AT HEADQUARTERS	.45	1
		AT RIFLE COMPANIES	.35	2
		AT WEAPONS COMPANY	.20	3
	ORGANIZATION FOR PLANS AND OPERATIONS	S-3	.33	1
		FWD AIR CONTROL	.31	2
		AIR	.20	3
		NBC	.16	4
	CLERICAL SUPPORT	UNIT DIARY ADMIN	.32	1
		PERSONNEL ADMIN	.28	2
		GENERAL ADMIN	.26	3
		LEGAL ADMIN	.14	4
	TARGET ACQUISITION	NIGHT OBSERVATION	.36	1
		SCOUTS	.26	2
		GROUND RADAR	.20	3
		SNIPERS	.18	4

Figure V-6 - Evaluation of Design Attributes by Importance of Contribution to Mission

An example of the feelings of the panel on the several attributes can be seen by quickly reviewing figure V-6. For instance, the members prefer a four company battalion with a

balance between antitank and light machine guns and a sizable quantity of squad automatic weapons over a three company battalion with heavy machine guns and heavy mortars. They would favor scaling down the message center if this were the only way to ensure an ample radio section, and would give up the ability to operate an organic dining facility in order to preserve adequacy of staffing in the supply section. By using the tradeoff positions shown, many questions involving the evaluated attributes were able to be corsidered in light of the panel's judgment, without actually referring each specific question to each panel member personally.

The application of these tradeoff factors in developing a 900-Marine infantry battalion is discussed in the following paragraphs.

• *Infantry Battalion Model*

The organizational template for an infantry battalion which could be developed from the advisory panel's guidance, and discussions includes the following design features:

•• *The battalion should:*

- Have four maneuver elements;
- Have a separate weapons company and a headquarters and services company;
- Include squad automatic weapons;
- Possess an almost equal mix of anti-armor weapons, M60 machine guns, and 81mm mortars;

- Ensure adequate radio communications means;

- Optimally staff certain logistics sections, even if certain others must be reduced to support such action;

- Centralize the organization for NBC defense;

- Provide Forward Air Controllers before assigning; (staff) Air Officers.

- Include unit diary administrative personnel;

- Have a night capability;

- Include some weapon system that could be used effectively for point air defense against armed helicopters when required, e.g., .50 caliber machine gun;

- Furnish the means to extend infantry battalion weapons ranges;

- Add a limited scout-sniper ability to the battalion headquarters;

- Include an assault weapon;

- Contain sufficient mobility assets to keep the load on the infantryman at most at its present level.

•• *The battalion should not:*

- Base command and control potential on heavy or overly sophisticated systems;

- Specify that the billet of Weapons Company Commander be filled by an artillery officer;

- Mix types of light mortars at the battalion level;

- Include snipers in an exclusive role;

- Have an organic, dedicated anti-air capability other than what can be provided by some multipurpose weapon;

- Be structured to include heavy mortars or heavy machine guns if the inclusion of such systems would require a degradation of others.

o *Advisory Panel Infantry Battalion Structure*

Figure V-7 is a schematic diagram of a representative infantry battalion which incorporates the consensual opinions of the panel. This battalion consists of a Headquarters and Service Company, three rifle companies (6-152) plus a fourth maneuver element within the Weapons Company.

Rifle companies are structured with 11-man Rifle Squads and incorporate the Squad Automatic Weapon (SAW). The Weapons Platoon consists of 60mm mortars (LWCMS), M60 machineguns and Assault Sections equipped with 90mm Recoilless Rifles.

The Weapons Company (8-251) consists of:

- A four section 81mm mortar platoon (1-52);

- A four section Anti-armor Platoon (1-70) equipped with DRAGON missiles;

- A Machinegun Platoon (1-38) comprised of a Light Machinegun Section (M60, 7.62mm) and a four-squad Heavy Machinegun Section armed with M2, .50 caliber machineguns;

- An Infantry Element (3-85), serving as a fourth maneuver element, consisting of two rifle platoons and a weapons section (mortars and assault weapons).

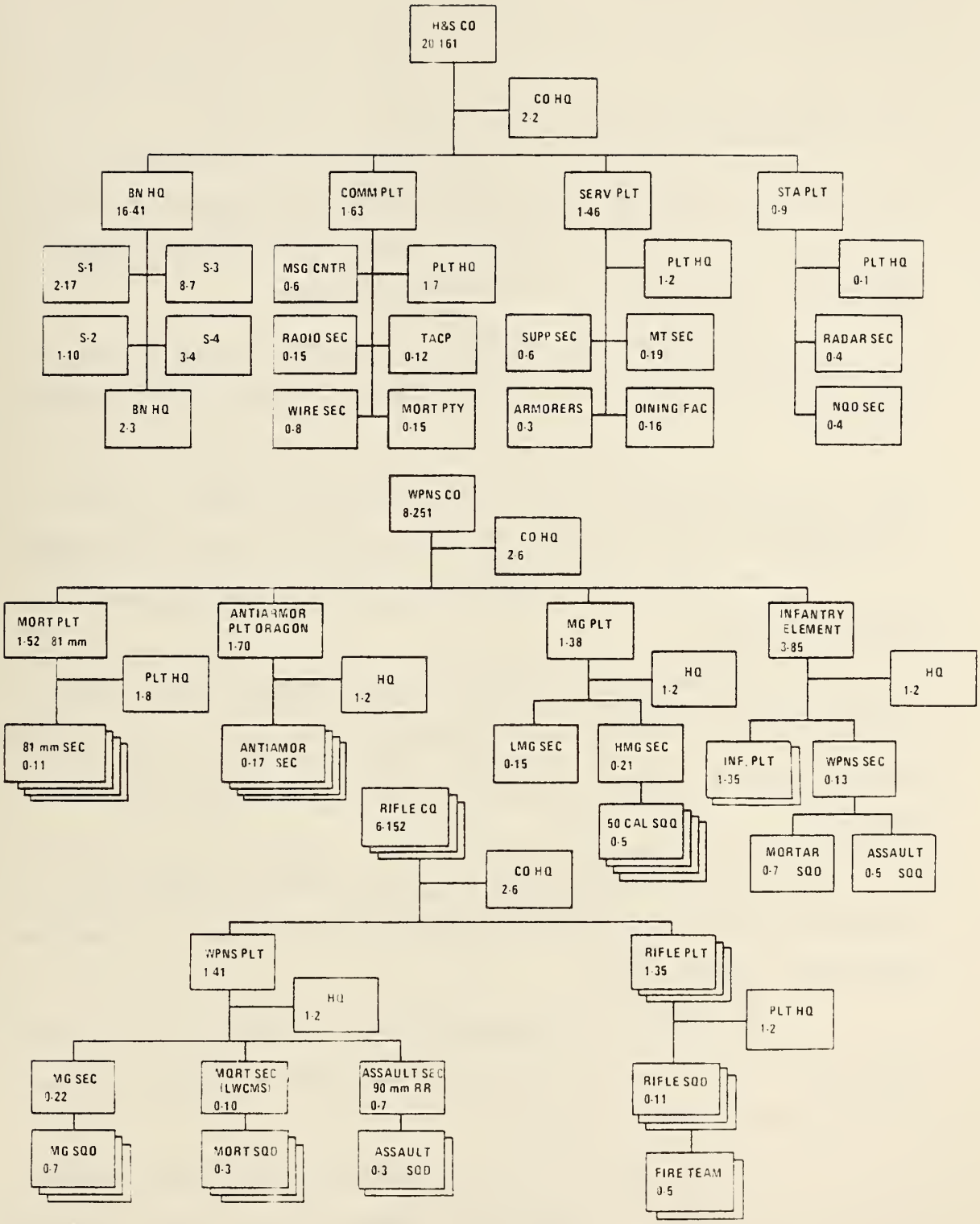

H&S CO
20 161
CO HQ
2-2
BN HQ
16-41
COMM PLT
1-63
SERV PLT
1-46
STA PLT
0-9
S-1
2-17
S-3
8-7
S-2
1-10
S-4
3-4
BN HQ
2-3
MSG CNTR
0-6
PLT HQ
1-7
RADIO SEC
0-15
TACP
0-12
WIRE SEC
0-8
MORT PTY
0-15
PLT HQ
1-2
SUPP SEC
0-6
MT SEC
0-19
ARMORERS
0-3
DINING FAC
0-16
PLT HQ
0-1
RADAR SEC
0-4
NCO SEC
0-4
WPNS CO
8-251
CO HQ
2-6
MORT PLT
1-52 81 mm
PLT HQ
1-8
81 mm SEC
0-11
ANTIARMOR
PLT DRAGON
1-70
HQ
1-2
ANTIARMOR
0-17 SEC
MG PLT
1-38
HQ
1-2
LMG SEC
0-15
HMG SEC
0-21
50 CAL SQD
0-5
INFANTRY
ELEMENT
3-85
HQ
1-2
INF. PLT
1-35
WPNS SEC
0-13
MORTAR
0-7 SQD
ASSAULT
0-5 SQD
RIFLE CO
6-152
CO HQ
2-6
WPNS PLT
1-41
HQ
1-2
MG SEC
0-22
MG SQD
0-7
MORT SEC
(LWCMS)
0-10
MORT SQD
0-3
ASSAULT SEC
90 mm RR
0-7
ASSAULT
0-3 SQD
RIFLE PLT
1-35
PLT HQ
1-2
RIFLE SQD
0-11
FIRE TEAM
0-5

Figure V-7

•• *Design Features*

The design features favored by the Advisory Panel are manifested in this structure. Some of the more salient features of the structural template include:

- Four maneuver elements comprised of the three rifle companies plus a smaller Infantry Element in the Weapons Company.

- Provisions for incorporating the Squad Automatic Weapon (SAW) in the 5-man fire team of the 11-man rifle squads.

- A full (i.e., eight team) four section DRAGON missile platoon.

- A four section 81mm Mortar Platoon, albeit considerably reduced in terms of manpower; this unit is considered capable of full platoon operations but displacement only in echelons.

- A machinegun platoon in the Weapons Company, incorporating both long-range .50 caliber (M2) systems and medium-range M60, 7.62 systems.

- Provisions for adequate radio communications vested in the Radio Section, TACP section, and Mortar Support Section of the Communications Platoon.

- Battalion staff sections were slightly modified to:

  •• Enhance embarkation capability in the S-4 section.

  •• Centralize and enhance NBC defense capability in the S-3 section.

•• Retain current levels of FAC's (2) and the Air Officer in the S-3 section.

•• Retain current levels of unit diary administrative clerks in the S-1 section.

•• Furnish an organic scout-sniper capability by assigning a seven-man section to the S-2.

- Addition of the M2, .50 caliber machinegun to the Weapons Company not only extends the battalion's weapons' ranges for both antipersonnel and anti-armor fire, but also provides a limited capability for point air defense.

- As an interim measure, the 90mm recoilless rifle was selected as a representative assault weapon for the infantry companies; some substitution in actual weapon might be necessary, but the panel's recommendation is primarily to ensure that structure is available for an assault weapon whenever such a system becomes available.

Further discussion on the strengths of this candidate structure may be found in the discussion of candidate "C" (a variant of this design) in Section VII.

VI. SUMMARY

The completion of the analysis of the Marine Infantry Battalion produced an extensive list of desirable characteristics. To develop the "optimum infantry battalion for the 1980's" required the blending of weapons systems' effectiveness with options of personnel structuring. Thereby, a precise set of candidate structures could be designed that can engage the threat with sufficient firepower, mobility, and survivability.

Prior to describing the candidate structures, this section provides a summary of each analytical step that has been completed. The reader should be refreshed in the recognition of the salient characteristics of the recommended infantry battalion structure.

Several apparent trends in American involvement in modern international conflicts have been considered. It was concluded that there is a pattern which indicates a greater likelihood of USMC infantry battalion employment in the 1980's against a Soviet or Soviet-like adversary than against one otherwise organized. Furthermore, a review of post-1946 crises showed that a significant number of them occurred in areas accessible to U.S. forces by sea. The affinity between accessibility and MOBA along with these two conclusions favor the design of

the USMC infantry battalion of the eighties around a sufficient amount of combat power to face a Soviet-like opponent in an amphibious setting, and to have the flexibility for almost-certain MOBA as well as other specialized operations.

To define the elements of combat power needed to face such an opponent, a review of current intelligence sources was performed. This assessment identified the strong points of the Soviet/Soviet-like organizations anticipated during the 1980's. These threat capabilities suggested several features which must be considered in designing an adequately forceful Marine infantry battalion.

Threat capabilities that required corresponding USMC structure or other actions included: maneuver, firepower, engineer, aviation, and radioelectronic combat potential.

The likelihood of amphibious and urban operations calls for structural consideration of logistics (both MOBA and amphibious), command and control, special firepower needs, and intelligence and/or reconnaissance elements.

In addition to threat capabilities for the eighties, the impact of U.S. technological developments was also considered. Some of the technology expected to be implemented in military hardware throughout the next decade will dampen the effect(s) of certain threat strengths, but the remaining threat capabilities will require counterbalance through modifications in

structure.

For purposes of the analysis, unit effectivess was considered to be the measure of a unit's ability to reconstitute after personnel/equipment degradation. Using the AMORE computer model unit effectiveness curves which displayed recovery rates and levels were prepared. Units which were able to reconstitute a certain level of combat effectiveness after losses occurred were considered satsifactory. Chokepoint and factorial analyses of possible alternative structures were also conducted to elaborate on the first conclusions.

In brief, a major conclusion of this effort was that traditional Marine infantry organizational concepts are quite sound in terms of organizational efficiency. Although the examination produced satisfactory results for almost every infantry battalion module which was analyzed, it also suggested areas for improvement in each. With the one exception of the weapons platoon (sustained operations), all units were able to reconstitute a satisfactory number of essential personnel teams. Some materiel improvements were indicated for the rifle company. Perhaps the greatest insight gained from the analysis was an appreciation of the value and need for cross training in certain billets, especially DRAGON gunners and fire support/air control personnel.

As an extra facet in examining the effects of casualty and equipment losses on organizational efficiency, the question of unit readiness was reviewed using the AMORE model. The whole battalion was considered, and examination criteria were set at three levels as follows:

Level I - 90% of T/O strength
85% rank/MOS match for sergeants and above
90% essential materiel operational

Level II - 80% of T/O strength
75% rank/MOS match for sergeants and above
80% essential materiel operational

Level III - 70% of T/O strength
65% rank/MOS match for sergeants and above
70% essential materiel operational

Each of the three levels shown above was compared with the essential personnel/essential materiel teams used in the AMORE model. Very little correlation between the two sets of criteria was detected. The model indicated that unit effectiveness measured in terms of essential teams was consistently lower than the effectiveness level hinted at by gross indicators such as on board personnel strength percentages.

Any technique for evaluating unit readiness should consider the very important aspect of the effect on readiness of organizational efficiency. The criteria chosen for comparison inflated unit readiness when it was measured in terms of recoverability. A conclusion can be formed that readiness criteria which use gross assessments as a base are less valid indicators than other techniques might provide. Criteria which tie critical personnel skills to staffing levels and essential operable materiel items to authorized equipment numbers appear to have the potential for providing a meaningful measure of a unit's effectiveness (readiness) for combat.

The wargame formed an important part of the infantry battalion study. It was designed as an analytical tool to provide useful data for the resolution of basic questions concerning battalion organizational structure combat effectiveness. The two-sided, free play game provided an opportunity for recent infantry battalion commanders to exercise professional skills against a Soviet motorized infantry battalion. The principal objective of the wargame, of course, was to determine whether the infantry battalion was more effective with three rifle companies or four rifle companies. Secondly, other significant organizational factors would also be identified during the progress of the games.

Many shortfalls (i.e., firepower, maneuver, sustainability) do exist in the current battalion tables of organization and were so identified during the play of the game or were addressed separately by the players during the wrap-up session. Items discussed orally by the players (i.e., types and density of weapons, command and control, air defense requirement, logistics, task organization) do appear in other chapters of this report. What appears below and in the summary portion of the wargame chapter were the quantifiable results of the data from the games. These significant results are stated here again in this transitional chapter to reinforce the need for the reader to consider them as he deals with the section on candidate structures.

The analysis showed that a four rifle company battalion structure had greater movement of maneuver elements. That is to say, the maneuver elements of a four rifle company battalion moved more boldly and over greater distances on the battlefield as opposed to a three rifle company battalion.

An important lesson that resulted from the games was the need for mobility. This requirement became obvious in terms of attrition of the friendly forces. The friendly units that survived the best (sustained least attrition) were the ones that used "shoot and move" tactics across the battlefield.

Increased mobility (even by foot) produces less attrition for the friendly units.

When combat firepower ratios of the wargame adversaries were measured, the data showed that a four-company battalion structure had less attrition. The finding in each of the above three cases is that four smaller companies as opposed to three larger companies sustained fewer casualties. The implication is that the four-company battalion provided smaller unit targets (in terms of personnel) with more widely dispersed units across the battlefield. The analysis showed that a four-company battalion had less firepower degradation than a three-company battalion for these reasons. It also may well be safe to say that in a nuclear environment, the greater dispersion of a four-company battalion may lend itself to greater survivability of that unit.

The organic and attached firepower resources of the battalion (i.e., DRAGON and TOW) were decentralized down to the company level. This method permitted earlier engagement of the enemy units and allowed more frequent engagements over time. This action accounted for early high attrition of enemy forces and the overall heavier losses of enemy forces.

Inherent in the task of structure development was an analysis of the weapons systems which generated the firepower

aspect of combat power for the infantry battalion. This review, which appeared in Section III-C, was not conducted with the thoroughness and vigor needed to recommend specific weapons or types but rather evaluated the nature of various infantry weapons sytems to gain an appreciation of the organizational and manpower requirements which accompany them. In the course of the examination some observations relating to weapons were unavoidably made and were included in this report as suggestions only.

Two factors precipitated the analysis of weapons systems for the infantry battalion, namely: the vast array of potential systems that are extant in, or programmed for, the forces of the Unites States, NATO, and other allied services; secondly, the size of the infantry battalion which was established to be "about 900" USMC personnel. This factor mandated an efficient selection of weapons that would optimize firepower characteristics and also provide a balanced blend of weapons. The study team considered the differing factors and advice and attempted to find that trade off point best suited to unit size and combat power to meet and defeat the threat of the eighties.

To determine those weapons systems and types (with which to equip) the USMC infantry battalion, a four-phase analysis

approach was selected:

Phase #1 - Weapons Systems Types — This phase was less quantitative and included the expert opinions of senior officers, recommendations of the Infantry Battalion Advisory Panel, a personal questionnaire, facets of the war game, and use of the computer analysis (AMORE) of battalion resiliency.

Phase #2 - Weapons Systems Characteristics and Capabilities This phase injected an objective, analytical perspective into the process. It provided "acid-test" comparisons between competing systems and type systems, and measured strengths and weaknesses of the competitors in terms of weapons systems characteristics and capabilities.

Phase #3 - Weapons Systems Mix — Development of a military unit with a mission as broad as that of the Marine Infantry Battalion must consider a mixed but balanced blend of weapons systems and types. This was done to ensure that the infantry battalion could not only engage Soviet-styled forces, but could also effectively operate in a MOBA environment, could also fight less conventional opponents, and could still be functional in restrictive terrain.

Phase #4 - Weapons System/Structure Integration — This phase dealt with the imposition of a 900-Marine personnel ceiling which dramatically impacts upon weapons system and

type selection. The objective was to incorporate as many of the weapons systems' desirable features with suggested structure trends as could be fitted into a bounded organization.

A summary of the analysis conducted on the types of weapons systems can be simply stated; that is, all weapons systems types (small arms, anti-armor, etc.) are deficient in their present state when compared against the threat. The infantry battalion weapons systems arsenal requires considerable upgrading; major and rapid action is required. Several conclusions concerning small arms were pointed out; such as, a more combat durable infantry rifle is desirable. development and fielding of a Squad Automatic Weapon for increased firepower and stand off distance is needed, and the need for continued development of armor-piercing ammunition capable of penetrating projected USSR BMP armor In the area of assault weapons, a current family of assault weapons systems is practically non-existent. Present systems are designed for purposes other than defeating bunkers and fortifications. A need exists, particularly in light of operations in a built-up area, to design a system(s) to defeat hard and soft bunkers, walls and fortifications. The future for the indirect fire weapons systems looks more promising. The new

LWCMS (60mm mortar) will enhance the infantry battalion's indirect fire capability. It also appears that the current mix of 81's and 60mm mortars may no longer be the most effective or efficient possible, due to the improvements (in terms of range, rate of fire and lethality) to the 60mm mortar. Improvements are also required to indirect fire ammunition development for a chemical round and to ongoing efforts including illumination, smoke and white phosphorus. Two conclusions were reached concerning the analysis of anti-armor weapons. First, more anti-armor weapons are needed in view of the future threat and the fact that present organic anti-armor systems do not have sufficient standoff range to effectively engage and maintain contact with moving enemy armored units. The future threat of a three-dimensional battlefield continues to grow rapidly. The absence of organic dedicated air defense systems is a distinct weakness in the infantry battalion's firepower equation. The air defense issue has been reviewed by the MCDEC Force Structure Study Group; their report includes a close look at air defense for the ground element of the MAGTF.

Suggestion of an optimal weapons mix for the Marine infantry battalion is difficult. A dichotomy emerges as we attempt to blend a finite set of weapons systems and types

into a fixed-size structure that must have the potential to execute a nearly infinite variety of missions. It is for this reason that the concept of task organization has been so important to Marines. Task organizing strengthens the close combat unit with additional non-organic assets which enables it to better execute its mission. In considering the question of weapons mix, the battalion commander must select the most appropriate mix to engage his immediate threat. From outside agencies he can gain heavy support of a longer range and a highly mobile nature through task organization. From within his own arsenal, however, he selects additional assets essential to the immediate battle via what could be termed "task weaponization." This process includes selection of not only those weapons systems which form the core of the infantry battalion organizational weapons structure but those from the unmanned arsenal of ordnance items. The unmanned arsenal concept within the infantry battalion provides the means through which "task weaponization" can take place. Those systems indicated as ordnance items would be requested and issued in the density desired by the commander. Thus, the infantry battalion commander can enhance the probability of success of his battalion engaged in close combat through both task organization and "task weaponization."

Having determined what weapons systems are essential for the battalion (see Section III-C), the next task is to determine how many of each can be included in the finite structure. The final array must be balanced and must maximize the firepower capability of the unit, not any specific weapon or type. Certain conclusions were drawn which are not repeated here, but appear in Section III-C, concerning the integration of weapons systems and structure. They served as the foundation for structuring the recommended infantry battalion appearing in Section VII.

An investigation of the various candidate structures for the infantry battalion regarding possible differences in vulnerability to tactical nuclear weapons was conducted using a computer-assisted model. Matrices and graphs were designed and represented weapon lethality, likely aiming points, delivery error information and deployment configurations of the candidate structures. Direct outputs were maximum losses and expected losses. Maximum losses correspond to a situation of perfect enemy intelligence (and weapon delivery). Expected losses correspond to no enemy knowledge of friendly positions, aiming based only on map reconnaissance and normal delivery error. Lethality was calculated in terms of personnel only. Supplies and equipment were not included because they would

be similar for each structure. Details of the methodology and conduct of the investigation can be found in Section-III D; only the results of that investigation are restated here.

The results of the investigation indicated that no one alternative battalion structure sustained more or less maximum casualties than the other. It should be pointed out, however, that H&S Company was located near the Weapons Company for control and security purposes. In short, against an informed enemy, the dispersion of the rifle companies on the battlefield was insignificant in reducing maximum casualties within each candidate battalion structure as long as H&S Company is collocated with the Weapons Company. The density of personnel from both units in a relatively small area offsets any improvements to maximum casualties gained through rifle company dispersion.

Similar results were obtained when the candidate structures were investigated to determine expected casualties. The results revealed that there were no consistent difference between alternative candidate structures. The vulnerability (casualties) is related to the number of men on militarily valuable (key) terrain. Battalion candidate structure with more units, capable of higher dispersion, are most vulnerable

when the units are not specifically targeted but are located on more military valuable terrain. However, if the units are sufficiently mobile to be located away from valuable terrain, smaller units maintain the higher survivability.

The command and control (C^2) advantages and disadvantages that result from reorganization of the infantry battalion remain obscure until the candidate structures are fielded as an operational unit. Command and control cannot become an afterthought driven by defined mixes (in the structures); it remains an integral part of designing a structure that will be effective upon the battlefield. The intangibility of many C^2 effects complicates the design problem. As one might expect, traditional staff functioning will probably be changed or altered in the 1980's as new weapons and equipment systems are introduced in the infantry battalion. Most importantly, the introduction of new and automated systems designed to enhance C^2 will create strong impacts on the traditional interactive relationships between command and staff sections. For that reason the analysis of command and control for the "infantry battalion of the 1980's" was centered on an attempt to relate those traditional hierarchies of battalion structure to the introduction of the Marine Tactical Command and Control System (MTACCS).

A human factor analysis approach was taken in reviewing Marine infantry battalion officer billets for the purpose of recommending commissioned officer strength reductions in conjunction with an enlisted strength reduction. A list of officer characteristics was developed which, when measured, were considered indicative of knowledge, skills, and thought processes demonstrated by commissioned officers. In evaluating each officer billet, most officer characteristics were assigned a numerical value of 1 to 5 while others were assigned a binary or ordinal value. The results of this systematic analysis provided a rank ordering known as an Officer Characteristic Score (OCS) for each infantry officer. The higher the score in these characteristics for each billet, the stronger was the indication that such a position should be filled by a commissioned officer. Conversely, billets that received the lowest scores (lower relative need) could be eliminated or filled by a staff non-commissioned officer. It should be mentioned that the results of the rank ordering of infantry billets are proposed as aids in making officer reduction judgments but are not substitutes for such judgments.

Message flow analysis within the infantry battalion was also conducted to define critical nodes of staff functioning and checkpoints. Correlating this information with the

results of human factors analysis would produce a refined preference ordering for officer billets. Combat unit journals of sixteen battalions employed in land combat operations in Vietnam were evaluated by three "CPX battalion staffs" who processed each message internally and externally to the battalion. This analysis did not produce definitive results for use of the study team.

Technology in the 1980's will produce a series of systems that affect the infantry battalion. The greatest technological impact in the area of command and control (and communications as well) will occur by the introduction of the eight functionally orientated tactical and training systems of MTACCS. All of the MTACCS tactical subsystems have staggered IOC's and many of them will be operationally deployed down to the infantry battalion. PLRS, TCO and MIFASS are further advanced in the research and development process and their impact on the infantry battalion can be further defined than the others.

To summarize the effects of MTACCS, the tactical subsystems will provide automation capable of making the infantry battalion commander and his staff efficient, real-time decision-makers. The acceptance of all the subsystems is based on subjective analysis; MIPS and MILOGS cannot be

analyzed beyond generalities due to lack of definition of the systems. Command and control will be enhanced tactically, yet there is a price to pay not only in dollar costs but in other areas. The coordination of maintenance requirements, additional equipment density, need for present systems to act as redundant backup systems (initially), probable manpower increases and increased training requirements are obvious degradations.

For the purpose of analysis, a general logistics appraisal was conducted and was based on the use of a set of similar but varied infantry battalion structures. The general appraisal included effects upon mobility (both strategic and tactical) precipitated by structural change. Examination of new equipment and the Table of Equipment also was done to measure the effects upon various battalion structures.

Increased mobility and ability to maneuver are desired characteristics of the infantry battalion basing these observations on analysis of battalion structure versus the "threat of the 1980's." The future battlefield will feature rapid engagements and violent conflict. Small-sized units must move rapidly and be capable of dispersing over a large area of operations. Logistical supportability will be more difficult for supply and resupply and for evacuation of

casualties. It is recognized that tempo of operations and tactical employment influence logistical considerations. However, structural iterations create the immediate need to define the logistical requirements resulting from these changes. The logistical effects upon mobility must be measured first by changes in the organization's structure.

Appraisal of the infantry battalion structures in the area of strategic mobility concluded that battalion structures containing similar numbers of personnel did not vary. However, strategic mobility would be affected if equipment densities are varied. That is, the inclusion of APC's in one structure and not another has an intuitive impact upon strategic mobility. Lift assets are different in this case.

Logistical implications for tactical mobility are more complex. If tactical mobility is defined as a function of foot mobility, vehicular mobility, or air mobility, logistical implications are more self-evident. Briefly, the foot mobile battalion gains access to marginal terrain denied to vehicular mounted troops. What is sacrificed is the capability to meet, maneuver rapidly and defeat a postulated mechanized threat. Based on this, there would appear to be a requirement for a mix of vehicular and air assets to compensate for maneuver deficiencies. The addition of vehicular

assets increases the capability to supply and resupply maneuver elements and evacuate casualties in a more timely manner. Speed of delivery and accessability to terrain increases when air assets can be used in lieu of ground vehicles which marks a strong advantage to the infantry battalion that is completely air mobile.

A subjective evaluation measuring the attributes of derived mobility for an infantry battalion was considered. Based upon these evaluations, air mobility appears to provide the greatest enhancements. To evaluate the requirements demanded to achieve air mobility, a brief analysis was conducted of helicopter lift requirements for battalion structures 1, 2 and 3.

In one instance the lift requirements were determined for a non-tactical lift of each of the notional battalion structures without attachments or detachments. The units common to all three structures were excluded from the calculations because they were considered to have equal lift requirements in terms of personnel, supplies and equipment. The second instance considered each battalion structure reinforced to form an initial lift of a notional Battalion Landing Team. The forces involved in the initial lift include all personnel and equipment of the rifle companies, weapons company and

essential elements of H&S company. The lift also included attachments from combat, combat support and combat service support organizations.

The comparisons made among the three battalion structures for a non-tactical lift show that there were no significant differences in lift requirements among alternative candidate structures. Each candidate structure is within 2 to 3 helicopter flights of the others. Candidate structure 3 had the highest overall lift requirements because of the addition of the TOW weapon systems to be battalion.

When comparisons were made among the three battalion structures reinforced to form a Battalion Landing Team, the results proved similar to the non-tactical lift. There were no significant differences in lift requirements among alternative candidate structures. Candidate structure 3 did have the lowest lift requirements (one or two less flights) when TOW assets are included in the battalion landing team. Otherwise, its requirements are higher as before.

Some logistical determinations can be developed by examining the current N-series Tables of Equipment (T/E). By selecting major end items of equipment from the T/E (N-1120 was selected for analysis) certain categories of major end items appear in some density that could be affected by

structural organization. The communications-electronics and motor transport items are focused upon since this is where the greatest density of major end items exist. Ordnance items are expected to fluctuate unilaterally within proposed structures of 900 Marines. It was determined that the additional communications-electronics assets needed for a fourth rifle company were insignificant. The lift requirement for these additional assets was considered minor.

Having a significant impact upon motor transport major end items of equipment is the near-term introduction of the Light, High Mobility Tactical Truck (5/4 Ton). This new, multi-purpose truck will replace the current 1/4-, 3/4-. and 1 1/4-ton tactical trucks presently in the existing T/E of the infantry battalion. Current plans call for a one-to-one replacement factor of the 5/4-ton truck. Comparing the lift capacities presently existing with capacities existing after introduction of the 5/4-ton truck into the infantry battalion's T/E, one can expect an increase of 125 percent organic lift capability within the infantry battalion.

The final approved candidate structure(s) will receive detailed logistical analysis to measure supportability and cost effectiveness. The preceding general logistics appraisal identifies criteria for evaluation of these structures so as to enhance potential combat power for the optimal infantry battalion.

The field evaluations conducted at Camp Lejeune were an attempt to determine the preferred size and configuration of the basic fighting unit of the infantry battalion, namely, the Marine rifle squad. In addition, the crew-served weapons units were also evaluated. The results of those evaluations were used as building blocks for the construction of a 900 Marine infantry battalion. Given the manpower constraints of 900 men, it was imperative to determine an optimally sized rifle squad which is capable of defeating the enemy on the battlefield of tomorrow. Once determined, any saved billet spaces could be used elsewhere to provide additional manning for added maneuver units, firepower systems and/or needed billets or sections not currently found in today's infantry battalion. The results of the opinion questionnaire completed by field grade and senior company grade officers of the Second Marine Division were tabulated. The data gained from the survey in most cases reinforced the field evaluation results. The survey information aided to a great extent in the development of the candidate structures.

Salient results of the field evaluations at Camp Lejeune and of the earlier more extensive squad level field tests conducted during the 1972 - 1973 time frame point out that a squad of two 5-man fire teams is a workable, highly acceptable and competent combat unit.

Along with the 11-man rifle squad, the seven-man machine gun squad proved to be superior to the nine-man machine gun squad in the mobility and gun emplacement evaluations. The elimination of the two ammunition men from the squad resulted in an increase in the weight of the individual's load, yet did not degrade the squad's ability to perform.

The evaluations indicated that a three-man mortar squad was capable of operating the 60mm mortar and providing the necessary fire support to the rifle company. The weight of the mortar and its basic allowance of ammunition (BA) dictate a four-man 60mm squad as the minimum size squad to be effective in a combat environment. As was pointed out by personnel in the evaluation and reinforced by the opinion questionnaire, a three-man mortar squad would be satisfactory if there were a means of redistributing the 60mm ammunition throughout the rifle company or by providing some means of ammunition transportation.

The 20-man 81mm mortar section (including three communicators) was considered satisfactory. Ammunition weight, inherent in the 60mm mortar system, was a problem in the 81mm mortar system during the evaluations. Given that under certain combat situations the 81mm mortar section would have to man-pack the mortars and their ammunition, a section of fewer

men (18 or 16) with the same equipment and ammunition loads probably could not sustain itself for long in combat. The field evaluations bear out this fact. It should be pointed out that the 20-man 81mm mortar section could be reduced to an 18-man section if there is a means of redistributing the 81mm ammunition among Marines of the battalion or by providing some means of ammunition transportation.

One factor that stood out during the crew-served weapons unit evaluations was the weight loads of the individual members of those evaluated units. The loads were heavy and, in some cases, slowed the Marines even under the existing ideal conditions. It must be stated that greater problems could result under more adverse weather conditions and over more rugged terrain. The point to be made is this -- a requirement exists to provide more mobility (in terms of transportation – ground or air) to reduce the loads of the individual Marine in a 900-man infantry battalion. The opinion questionnaire strongly endorsed this requirement.

The opinion questionnaire helped the Infantry Battalion Study Group to better focus on specific issues related to the infantry battalion as seen from the Fleet Marines Force. As we transition into the chapter dealing with the presentation of candidate structures, some of the more significant

issues from the questionnaire dealing with the battalion structure are presented below:

a. Four reduced rifle companies preferred over three full size rifle companies.

b. Infantry battalion needs more mobility (for personnel and equipment).

c. Three traditionally organized companies and one reduced size company with special capabilities was not preferred.

d. Infantry battalion needs more firepower, i.e., TOW, DRAGON, anti-bunker weapon (106RR), LAAW, M203, M60 machine guns and REDEYE (Air Defense).

e. Eliminate the M202 Assault Weapon.

f. The fire support coordinator should be the Weapons Company Commander and should be a Marine Captain.

g. A three squad rifle platoon was preferred with each squad containing either three 4-man fire teams or two 5-man fire teams.

h. The rifle company machine gun assets should be retained in the weapons platoon vice the rifle platoons.

i. Creation of an infantry fighting vehicle concept organic to the infantry battalion was not favored.

j. Three-man 60mm mortar squad is satisfactory.

k. Expand the S-1, S-2 is adequate, add clerks to the S-3, add an embarkation officer to S-4, no expansion of Supply and Motor Transport sections.

l. Add an administrative clerk to the rifle company.

m. Establish a battalion legal section.

n. Retain the company executive officer and first sergeant.

o. More NBC specialists are required in the infantry battalion.

p. A critical need for scout/snipers at the battalion level was identified.

The 16-member Infantry Battalion Study Advisory Panel provided insights into certain characteristics of the infantry battalion structure. The considerable amount of individual experience of the panel members brought into focus factors which could be better appreciated from real life than from analysis. As the panel reached conclusions in its several deliberations, a number of substantially intangible topics, such as the worth of leadership, individual and unit effectiveness in combat, and Marine air-ground synergism, began to assume dimension and substance. As a result, the professional judgment of the panel members took on the property of a "yardstick of experience." The "measurements" which resulted from this yardstick are summarized under each topic below.

Anti-air capability for the infantry. Advisory panel members agreed that a need exists for expanding the current two dimensional battlefield to a three dimensional battlefield as the probability of encountering enemy close air support increases during this decade. The greatest air threat to the infantry battalion stems from enemy rotary wing close air support in the vicinity of the FEBA. As a result, the need for forward area air defense (FAAD) will be more vital in the eighties than it has in the past. Questions which inspired strong debate included: where the air defense assets should reside, should air defense assets be organic or task organized to the infantry battalion, how many and what type weapons are required, who should control them, and what command functions are needed. The advisory panel concluded that the weapons of the infantry battalion should be expanded to include a multi-purpose weapon capable of engaging rotary wing aircraft and providing fire support to infantry elements when not being used in ar air defense role. Further, additional ground air defense systems capable of countering the enemy fixed wing threat should be located somewhere in the Marine Division other than the infantry battalion. This topic was passed to the study team examining overall Marine Corps force structure.

Infantry Weapons. In the arena of close, even personal, combat the infantryman's weapon is significant considering the possibility of future closure with an enemy armed with equivalent or superior individual weapons. In recognition of this substantial relationship linking infantry organizations to infantry weapons, the panel spent a large amount of time in weapons-centered discussions. In view of the smaller number of personnel assets in the new battalion, all panel members sensed a strong need to furnish firepower increases to offset manpower decreases. During the discussion held on infantry weapons, one overriding factor remained paramount: U.S. Marine infantry must remain light infantry. In weapons selection, then, force designers must not degrade this foot mobile capability. The panel's design philosophy was one of adding weapons punch, but retaining foot mobility. Panel discussions centered on three groups of infantry weapons: small arms, assault and anti-armor weapons, and indirect fire weapons.

Panel members' concern over the small arms weapon systems stemmed from three areas, namely: (1) recent problems with today's small arms (questionable reliability of the M16 rifles and M60 machine guns), (2) apparent superiority of Soviet/Warsaw Pact small arms (high reliability, greater standoff

distance but at a cost of greater weight), and (3) the absence of dramatic and timely U.S. improvements through the eighties. Panel members agreed that infantry battalion structure for the eighties must allow for incorporation of both range and reliability improvements to the small arms systems. The advantages and limitations of candidate weapons were discussed in consonance with the need for a balanced infantry battalion structure capable of continuing to carry out its current mission and tasks. The panel concluded that:

(1) Some .50 caliber machine guns should be added to the infantry battalion arsenal to provide greater range, heavier small arms firepower, and a limited (rotary wing) air defense capability. Structure spaces provided for the .50 caliber machine gun would serve as a hedge to allow future introduction of the 40mm M19 machine gun.

(2) Employment of the sniper rifle provides extended range and improves our side of the standoff equation, enhances the suppressive value of the other less accurate infantry weapons (on the FEBA), and proves greater accuracy to deal with selected personnel targets (tank commander) and small lucrative targets (laser designators).

(3) The Squad Automatic Weapon (whatever weapon is selected) should be procured as rapidly as possible. Present

structure is adequate for immediate introduction of the SAW as a replacement for the automatic M16 rifle.

Discussions concerning the sniper rifle also centered on the value and employment of the sniper and scout in the infantry battalion. The panel's concern over reduced personnel assets led to a conclusion that retention of the traditional scout-sniper combination would be preferable to specialization. Specialized scouts or snipers would require dedication of manpower resources to billets which would be utilized only part-time, i.e., as the tactical situation permits. The advisory board also concluded that scout/sniper must have other roles within the battalion and that scouting should play the more prominent role. Furthermore, the most likely placement for the scout/sniper teams should be within the battalion S-2 section and not as a subordinate element of the Weapons Company.

Assault and Anti-Armor Weapons. The primary conclusions of the advisory panel, in terms of assault weapons, can be expressed as a grave concern over the lack of a suitable organic assault system. The basic consensus was that an assault weapon of some type should be acquired as rapidly as possible and that structure spaces be identified now for the rapid assimilation of the weapon into the battalion's arsenal.

In the area of anti-armor weaponry, the issue of centralized versus decentralized control of anti-armor assets prevailed. Several factors indicated that anti-armor assets should be located and employed in a centralized fashion, i.e., costs of training and training devices, complexity of system maintenance, sheer practicality of centralized training, and decentralization is not inconsonance with current doctrine. The advisory board felt that the density of DRAGONS was adequate in that current plans will provide for 32 systems per battalion. It was suggested that some added DRAGONS be placed in the rifle companies temporarily, both to preserve structure into which an assault weapon could later be assimilated and to provide for increased density to levels greater than those already envisioned. The panel also agreed that the factors which favored centralization of DRAGONS operated even more strongly to favor continued centralization of TOW assets.

Indirect Fire Weapons. Mortars placed high on the panel's list of important items. The ranges of the 81mm mortar and new 60mm mortar made those weapons indispensable to the infantry battalion. The threat mandates as much USMC indirect organic firepower as possible to allow for the destruction of enemy infantry after dismounting from

damaged or destroyed vehicles (by TOW or DRAGON systems) at distances greater than traditional small arms ranges. The dismounted enemy infantry become ideal targets for indirect fires by both organic and supporting weapons. The panel, therefore, recommended no reduction in the number or caliber of the infantry battalion's organic mortar assets. In fact, they favor close examination of systems such as the TAMPELLA lightweight 120mm Mortar.

The question of expensive manning of the 81mm mortar system prompted consideration of mixing the mortars (81's and 60's) at the battalion level. The panel did not feel that the creation of such a hybrid organization was sound, even if lethality and range capabilities could be preserved with fewer personnel.

VII. CONCLUSION AND RECOMMENDATIONS

- *Introduction*

Throughout the process of structure formulation, it became readily apparent that the design strategies and resultant characteristics which could be considered were as vast as the variety of weapons mixes that could be evaluated. Obviously, therefore, not every design feature could be adopted. The study did not summarily reject any design characteristic outrightly, but considered its applicability within the context of whether it enhanced the infantry battalion's abilities to shoot, move, and communicate.

Above all other considerations, these three simple organizational features provided the fundamental direction as to essential design characteristics. To as great an extent as possible, these characteristics and their inherent features were maximized or at least determined to be adequate in each structure.

- *Design Limitations*

Obviously, not all preferred components can be integrated into a 900 man unit. This design limitation was the singularly most difficult constraint faced in developing suggested structures.

Any attempt to construct an organization which is parametrically bounded will intuitively have limitations. These inner bounds are further complicated as competing design features vie

for their share of the limited billets. In short, tradeoffs, though not necessarily desirable, had to occur. Some such design features are readily apparent, such as whether the battalion should be structured with three rifle companies or four. Either of these can be accomplished, but to achieve four requires that other units or elements of the battalion be reduced or assigned lower priorities in the final tradeoff consideration.

Similarly, consideration had to be given to the effects of thirteen-man rifle squads versus eleven-man rifle squads. In a four-company battalion, thirteen-man rifle squads require 72 spaces more than if the same four companies had eleven-man squads. A seemingly minute change at the lowest level then creates a multiplier effect when applied throughout the unit.

Weapons systems create additional dilemmas, too. The 81mm mortar is a prime example. Traditionally, each 2-tube 81mm mortar section required 19 Marines, plus 3 additional Marines from the Communications Platoon. Previously, such a personnel requirement was not of great concern. Now, however, a question centers on whether the battalion can afford to dedicate 82 Marines (plus 15 from Communications Platoon) to only eight weapons systems. The list of similar questions was extensive and included such considerations as the requirements of Marine Tactical Command and Control Systems, the minimal number of cooks and bakers, more NBC specialists, the optimal number of scout-snipers, adequacy of administrative sections, comparison

of three versus four-man machine gun teams, and the competing demands of garrison and training versus combat.

In the structures which follow, consideration was given to each of these, and many more, design features and limitations as objectively as possible. Not all competing factors were capable of complete, satisfactory resolution in the minds of all who worked on these structures. In the final analysis, the decisions which produced the following structures were pointed toward enhancing the battalion's abilities to shoot, move, and communicate--in combat.

• *Structures*

In the following paragraphs, three alternative infantry battalion structures will be presented and compared. Two of these structures will be discussed in general terms. The third, the preferred structure based on analysis, tradeoffs, and consideration of the threat, will be discussed in detail. An additional, fourth configuration will also be covered in general, as appropriate for long-range implementation.

•• *Structure "A"*

Figure VII-1 depicts a detailed organizational wire diagram of Structure "A."

Structure "A" is a four-rifle company infantry battalion, with a Weapons Company and a Headquarters and Service Company. Total unit strength (USMC officer and enlisted) is 916 personnel (48-868).

STRUCTURE "A"

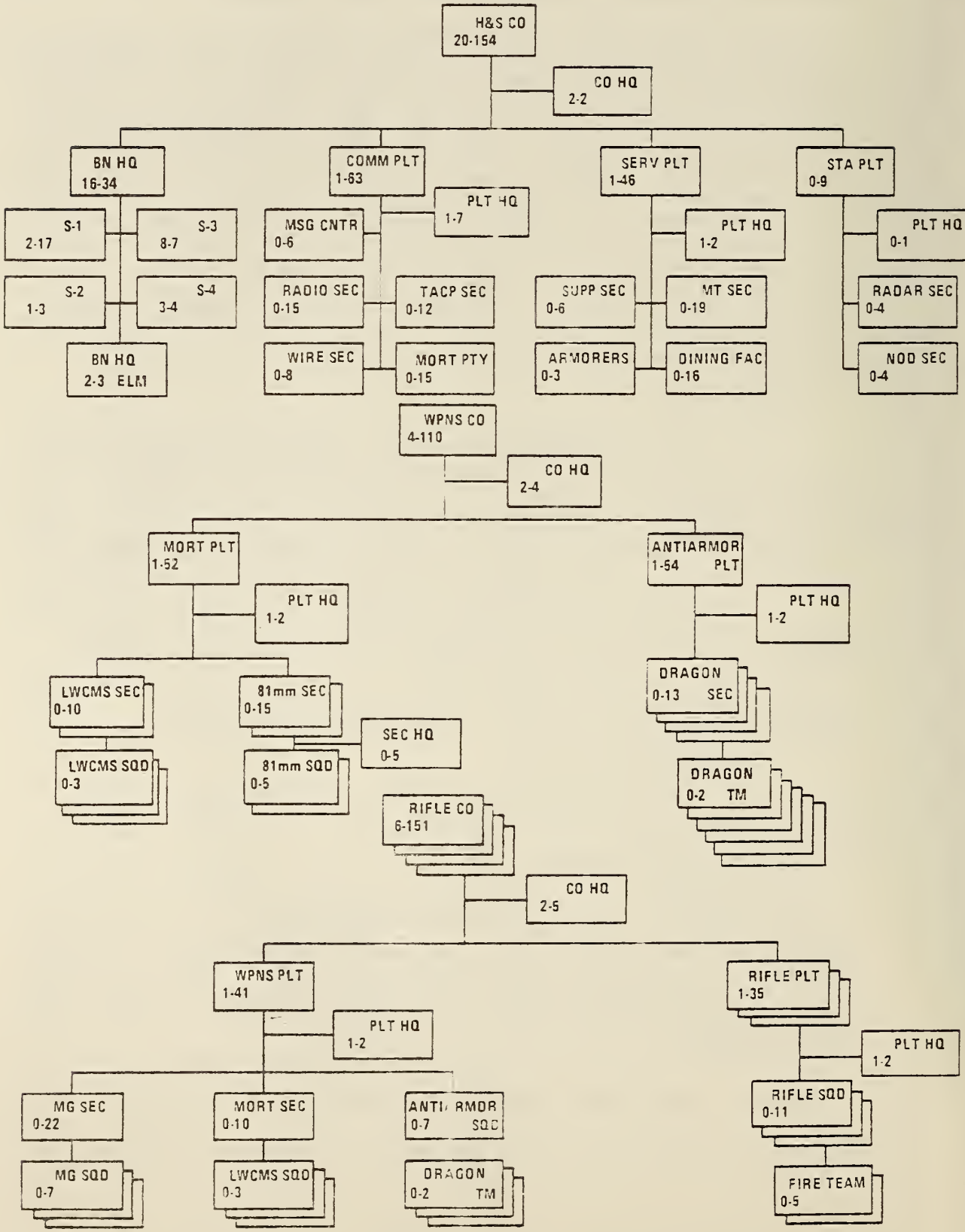


Figure VII-1

Headquarters and Service Company organization is similar to that currently supporting the "I" Series T/O. However, a few of the more salient modifications to this unit include:

(1) Creation of a two-man legal unit in the S-1 section;

(2) Redistribution of five Administrative Clerks (0151) to each Infantry Company Headquarters and to Weapons Company.

(3) Addition of one NBC Specialist and one clerk/messenger to the S-3 Section;

(4) Addition of an Embarkation Officer billet to the S-4 Section. Other slight modifications are also incorporated.

The Weapons Company contains indirect fire and anti-armor capabilities. The mortar platoon contains a total of 10 mortars (4-81mm plus 6-60mm LWCMS, mortars) organized into four sections. The Anti-armor Platoon, equipped with DRAGON, is also organized into four sections; however, each section possesses six teams (24 teams/platoon) vice the currently structured three section (eight teams per section) platoon (24 teams, also). Both of these platoons provide one *supporting indirect fire section and one supporting anti-armor section per major maneuver element (rifle company).*

The four infantry rifle companies are smaller than traditional USMC rifle companies, primarily due to the incorporation of 11-man rifle squads vice 13-man squads. The rifle

companies are equipped with machineguns, rifles, M203 grenade launchers, mortars, and anti-armor DRAGONS. Anti-armor LAAW and SMAW assault systems are provided as ordnance items. SAW and RAW can be incorporated into fire team elements.

•• *Structure* "B"

Figure VII-2 is a detailed organizational wire diagram of Structure "B."

Structure "B" is a three-rifle company infantry battalion, with a Weapons Company and a Headquarters and Service Company. Total unit strength (USMC officer and enlisted) is 902 (43-859) personnel.

Headquarters and Service Company is similar to that presently supporting the "I" Series T/O, and incorporates a few modifications similar to those found in Structure "A."

The Weapons Company possesses full complements of both 81mm mortars and anti-armor DRAGON assets. Each such unit contains four sections, thus providing a supporting to supported unit (rifle companies) ratio of 1.33:1.

Similarly, there are four squads (teams) per section (squad) in the Weapons Platoon of the rifle company. This provides the same supporting to supported unit (rifle platoons) ratio as at the battalion level. The rifle company is structured with 13-man rifle squads.

Structure "B" is actually a modified version of the "X" Series T/O adopted by FMFLANT for a short period in CY 1979.

STRUCTURE "B"

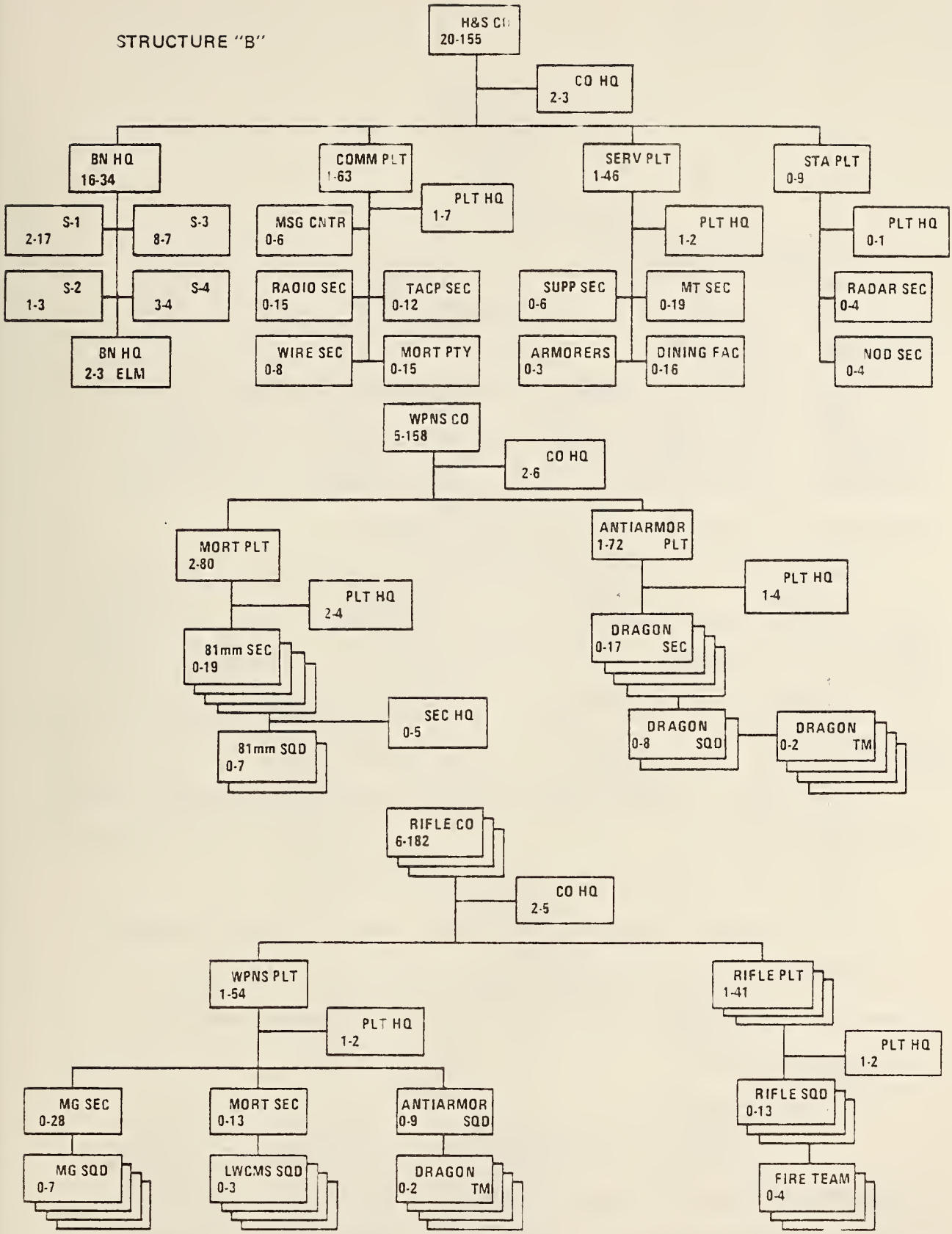


Figure VII-2

•• *Structure "C"*

Figure VII-3 is a detailed organizational wire diagram of Structure "C."

Structure "C" is comprised of three fully manned rifle companies and a fourth infantry element of less capability called a Special Infantry Troop. This infantry unit is resident in the Combined Arms (Weapons) Company.

The battalion contains a Headquarters and Service Company, generally as described in previous structures. The Combined Arms Company contains indirect fire assets (both 81mm and 60mm), anti-armor assets (both DRAGON and TOW), heavy machine gun assets, and a maneuver asset (rifle company (-)).

Total unit strength, USMC officer and enlisted, is 916 (47-869) personnel.

• *Structure Comparison*

As combat power is chiefly manifested in the firepower and maneuver capabilities of a unit, these two components were used to determine the prime initial worth of competing structures.

•• *Firepower*

The Weapons Effectiveness Index/Weighted Unit Value (WEI/WUV) methodology incorporates the relative firepower, mobility, and survivability of a unit's weapon systems into a numerical value through which differently configured units can be compared. The precise methodology and indices are classified

STRUCTURE "C"

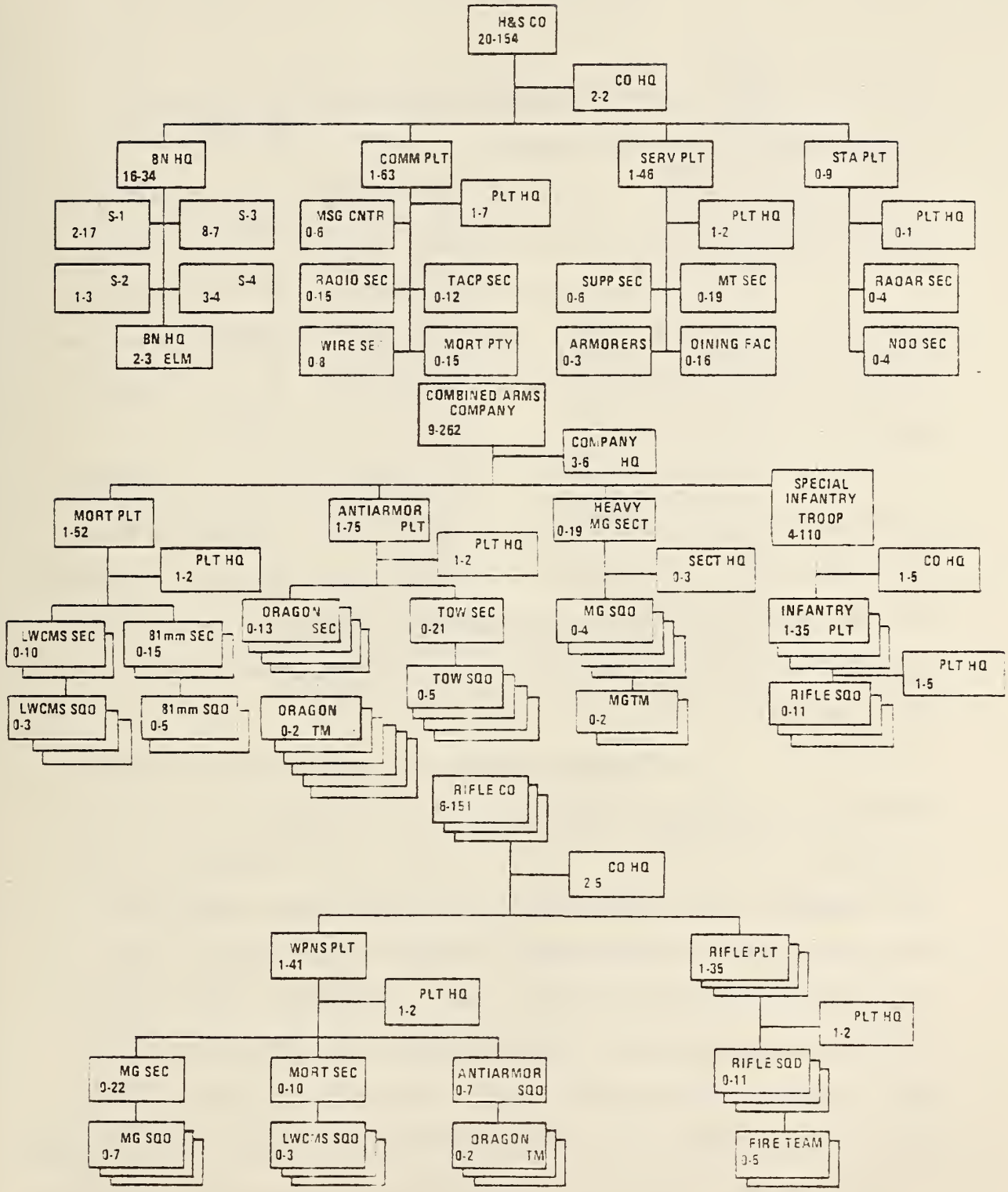


Figure VII-3

and not included in this report, but the results of these calculations can be presented.

Not only are the structures formulated by this report included for comparison, but also three additional structures:

- The "M" Series T/O is the battalion structure in effect until 1979. This structure included four rifle companies and an H&S Company (with 81mm mortars, and anti-armor weapons).

- The "X" Series T/O was the structure adopted by FMFLANT infantry battalions in early 1979, replacing the "M" Series T/O. This series includes an H&S Company, a Weapons Company (with 81mm mortars and DRAGON) with four sections per platoon, and three rifle companies (with enhanced weapons platoon sections).

- The "I" Series T/O was the structure adopted originally by FMFPAC infantry battalions in early 1979 to replace the "M" Series T/O. It includes an H&S Company, a Weapons Company (with 81mm mortars and DRAGON) and three rifle companies. On 1 December 1979, FMFLANT also adopted a revised version of the "I" Series T/O. Hence, all USMC infantry battalions are presently organized with the "I" Series T/O. As a result of the fact that the "I" Series T/O is the current table of organization, plus the fact that its total USMC strength is approximately that which this study was directed to consider, the "I" Series T/O was considered as the "baseline."

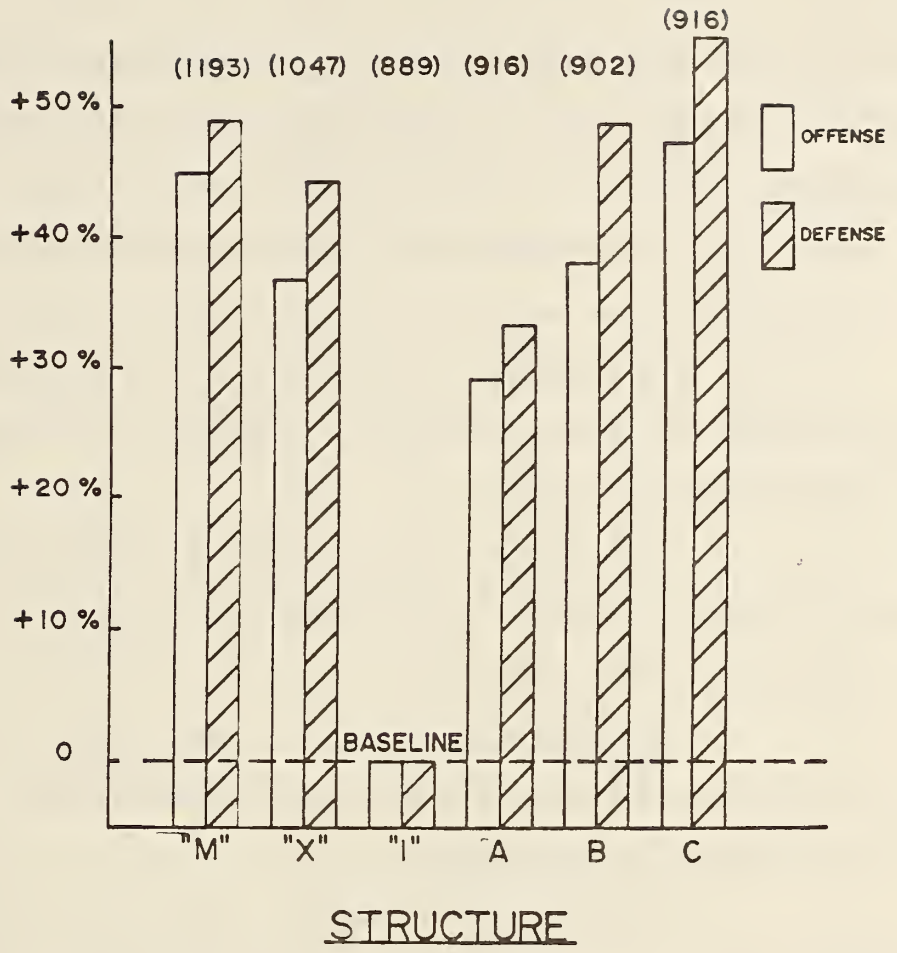


Figure VII-4 - Firepower Comparison

WEI/WUV scores for the previous tables of organization ("M," "X," and "I") and for this study's structures ("A," "B," and "C") are graphically shown in figure VII-4. Each structure's unit value is depicted as its relative percentage increase in total firepower, compared to the current baseline. Both offensive and defensive scores are presented in this manner.

As can be readily discerned, *the relative unit firepower capability of any structure considered herein for comparison is substantially greater than that presently inherent in the "I" Series T/O.* The reasons for these considerably greater scores are attributed generally to the following causes:

- "M" Series - larger numbers of personnel and greater numbers of supporting units (sections and squads) with crew-served weapons;

- "X" Series - larger numbers of personnel and greater numbers of supporting units (sections and squads) with crew-served weapons;

- Structure "A"- greater numbers of supporting units (sections and squads) using crew-served weapons, as a result of fourth rifle company;

- Structure "B"- greater numbers of supporting units (sections and squads) using crew-served weapons, plus an unusually dense distribution of anti-armor weapons;

- Structure "C" - greater numbers of supporting units and the addition of TOW. It is noted that this structure's firepower potential could be even greater than depicted, by including the air defense capability of the heavy machine guns.

•• *Firepower vs. Personnel Strength*

It was essential to compare firepower increases with unit personnel strengths. Figure VII-5 provides this comparison.

As can be seen, previous structures ("M" and "X") have achieved superior firepower (offensive and defensive average) compared to the baseline T/O, at least in part due to substantial numbers of additional personnel. The structures presented in this study, however, have achieved competitively superior firepower with only a very slight increase in personnel.

STRUCTURE	STRENGTH	FIREPOWER	Δ FIREPOWER PER Δ STRENGTH
C	+ 3%	+51%	17.0
"M" SERIES	+34%	+46%	1.4
B	+1.5%	+42%	28.0
"X" SERIES	+18%	+40%	2.2
A	+ 3%	+30%	10.0
"I" SERIES (BASELINE)	--	--	--

Figure VII-5 - Firepower and Personnel Comparison

Although the "M" Series T/O possessed 46% greater firepower than does the "I" Series T/O presently, it also required 34% more personnel. For each percent increase in personnel, there occurred only a 1.4% increase in firepower.

In comparison, Structure "C" increases firepower above the "I" Series T/O 51% with only a 3% increase in personnel. For each percent increase in personnel, there occurred a 17.0% increase in firepower.

Structure "B" achieves the greatest increase in firepower per percent increase in personnel (28%). This fact is significant; however, maneuver must also be considered as equally contributory to combat power. As will shortly be discussed, Structure "B" would not enhance maneuver above what currently exists.

•• *Weapons Density and Firepower Balance*

Although the two previous means of structure comparison have begun to demonstrate the enhanced firepower capability of each candidate, one more additional consideration must be discussed to ensure that these structures have not been inappropriately weighted. A comparison of the numbers of weapons systems (i.e., "density") for each structure will ensure that firepower has not been enhanced by drastically altering the weapons system type firepower balance.

Figure VII-6 shows the distribution of weapons systems in each of the candidate structures. This table indicates that the actual distribution of weapons systems has not fluctuated drastically from historical norms to those proposed by the structures presented herein.

However, an even more accurate portrayal is the percentage of firepower devoted to weapons system types. Figure VII-7 displays this additional consideration. Assault weapons system types are not included due to the turbulant nature of this system type, historically. Air defense weapons system types are similarly excluded.

WEAPON TYPE	M	X	I	A	B	C
M16	989	859	719	710	709	726
M203	110	110	110	146	83	146
M60, MG	35	35	35	35	35	35
M2, MG	--	--	--	--	--	8
M202 (MPFW)	12	12	12	SMAW	SMAW	SMAW
M19, 60mm	12	12	12	--	--	--
XM224, LWCMS	--	--	--	18	12	15
M29E1, 81mm	8	8	8	4	8	4
M72 (LAAW)	---------- MUNITION ----------					
M40, 106mm RR	--	--	4	--	--	--
M47 (DRAGON)	32	32	24	36	44	33
M220 (TOW)	--	--	--	--	--	8

Figure VII-6 - Weapons System Density

WEAPONS SYSTEM TYPE	M	X	I	A	B	C
SMALL ARMS	52	49	48	43	40	42
INDIRECT FIRE	22	23	26	26	24	22
ANTI-ARMOR	26	28	26	31	36	36

Figure VII-7 - Firepower Balance*

*NOTE: Numbers represent percentage of total unit offensive firepower calculated using WEI/WUV methodology.

As can be determined from Figure VII-7, firepower has maintained approximately a 5:2:3 (small arms: indirect fire: anti-armor) balance historically. The structures being considered currently modify this balance only to the level of 4:2:4. *In no instance is the variation of firepower density altered any greater than 10% in any weapons system type from historical norms*, represented by the "M" Series.

•• *Firepower Summary*

In terms of the firepower component of combat power, it has been shown that *this study's structures:*

- *Significantly enhance total unit firepower over and above the current infantry battalion organization ("I" Series T/O);*

- *Achieve enhanced firepower in highly efficient terms compared to manpower requirements;*

- *Maintain a proper firepower balance between weapons system types, essentially comparable to historical norms.*

•• *Maneuver*

As another important component of combat power, maneuver must be considered in any infantry organization's capabilities.

Figure VII-8 presents the first examination of maneuver potential. This figure pointedly demonstrates that maneuver is a matter of perspective.

MANEUVER UNIT LEVEL	M	X	I	A	B	C
RIFLE COMPANY	4	3	3	4	3	3 (+1)
RIFLE PLATOON	12	9	9	12	9	12
RIFLE SQUAD	36	27	27	36	27	36
FIRE TEAM	108	81	81	72	81	72

Figure VII-8 - Infantry Battalion Maneuver Units

If maneuver potential is viewed as vested in the lowest possible unit level, (i.e., fire team), then the "M" Series T/O possessed the greatest maneuver potential. Of those battalions of approximately 900 personnel, the "X" and "I" Series and Structure "B" possess the greatest maneuver potential--paradoxically, these structures have only 3 rifle companies, and similarly, the fewest maneuver units at all intervening levels (platoon and squad).

If maneuver, however, is viewed as better vested in higher level units, then those structures with four rifle companies (structures "A" and "C") possess the greatest potential. In these instances, this higher potential is maintained at all intervening levels (platoon, squad) down to the fire team level.

Since the concept of maneuver is limited mainly to military judgment, imagination, and creativity of the commander,

a high level of experience, and possibly even intellect, must be considered desirable in order to capitalize upon this ingredient in combat power. For this reason, infantry units which center their maneuver potential at higher levels (with more experienced commanders) appear to be more potent in terms of maneuver. Based on this logic, the structures presented herein significantly enhance (Structures "A" and "C"), or at least do not diminish (Structure "B") the maneuver potential of the infantry battalion as it has been known.

- *Proposed Structure Comparisons*

Figure VII-9 synopsizes comparative features of the three candidate structures.

CHARACTERISTIC	A	B	C
TOTAL STRENGTH	916	902	916
BASIC STRUCTURE			
H & S CO.	YES	YES	YES
WEAPONS CO.	LIGHT	HEAVY	HEAVIER
RIFLE CO.	4	3	3 + 1 (-)
RIFLE SQD. SIZE	11	13	11
SUPPORTING UNIT TO SUPPORTED UNIT RATIO	1:1	1.33:1	1:1
FIREPOWER			
BALANCE (SMALL ARMS/ INDIRECT FIRE (ANTI-ARMOR)	4:3:3	4:2.5:3.5	4:2:4
WEAPONS SYSTEM TYPES			
SMALL ARMS	STRONGER	STRONG	STRONGEST
ASSAULT	- - - - - MUNITION (SMAW) - - - - -		
INDIRECT FIRE	STRONGEST	STRONGER	STRONG
ANTI-ARMOR	STRONG	STRONGER	STRONGEST
AIR DEFENSE	NONE	NONE	STRONGEST
MANEUVER ELEMENTS			
RIFLE CO	4	3	3 + 1 (-)
RIFLE PLT	12	9	12
RIFLE SQUAD	36	27	36
FIRE TEAM	72	31	72

Figure VII-9 - General Characteristics

In addition to these general features, each structure possesses identifiable positive and negative attributes.

●● *Structure "A"*

- *Positive Features*

1) Suitably approximates the need for a unit of about 900 USMC personnel;

2) Firepower is properly balanced in relation to historical norms;

3) Firepower exceeds the present day "I" Series T/O;

4) Maneuver is significantly enhanced, through the four rifle companies;

5) Reserve/security missions can be adequately fulfilled by one rifle company;

6) Footmobile and light in terms of man-packable systems;

7) Organization is relatively simple, enhancing C^2;

8) Can incorporate 1980's infantry weapons without additional turbulence;

9) Efficient distribution of weapons systems and personnel;

- *Negative Features*

1) Unit firepower is less than that of either structure "B" or "C";

2) Engagement ranges against Soviet-styled forces are inadequate (as discussed in section III);

3) Does not possess any organic air defense capability to meet the three-dimensional threat;

4) Logistics planning may become more complex with increased numbers of dispersed units;

5) Communications security may be lessened due to a greater density of communications nets;

6) Reorganization of the current infantry battalion would cause some initial turbulence.

•• *Structure "B"*

- *Positive Features*

1) Suitably approximates the need for a unit of about 900 USMC personnel;

2) Firepower is properly balanced in relation to historical norms;

3) Firepower exceeds the "I" Series T/O and "X" Series T/O;

4) Footmobile and relatively light in terms of man-packable systems;

5) Unit organization is relatively simple, enhancing C^2, and logistics planning;

6) Can incorporate 1980's infantry weapons with minimal turbulance;

7) Reorganization of the current infantry battalion would create minimal turbulence;

- *Negative Features*

1) Firepower is less than that of Structure "C";

2) Engagement ranges against Soviet-styled forces are inadequate;

3) Does not possess any organic air defense capability to meet the three-dimensional threat;

4) Maneuver potential is considerably less than that of either structure "A" or "C";

5) Reserve/security missions would significantly degrade the unit commander's battlefield deployment options;

•• *Structure "C"*

- *Positive Features*

1) Suitably approximates the need for a unit of about 900 USMC personnel;

2) Firepower is properly balanced in relation to historical norms;

3) Firepower exceeds all historical, present, and proposed structures as discussed herein;

4) Maneuver is enhanced with three full rifle companies, and a fourth infantry element to fulfill reserve/security missions;

5) Footmobile and relatively light;

6) Possesses adequate weapons systems ranges to engage Soviet-styled forces;

7) Possesses a primitive organic air defense capability to meet the three-dimensional threat;

8) Possesses a light infantry unit capable of rapidly organizing for mounted infantry operations with attached mechanized assets;

9) Can incorporate 1980's infantry weapons without additional turbulence;

10) Most significant advance in battalion combat power of all candidates considered.

- *Negative Features*

1) Logistics planning may become more complex with increased numbers of dispersed units, a greater variety of weapons systems, and an increased quantity of vehicles;

2) Communications security may be lessened due to a greater density of communications nets;

3) Maintenance considerations will become more critical with more sophisticated weapons systems;

4) Reorganization of the current infantry battalion would create significant initial turbulence.

5) A potential exists for misuse of the infantry unit within the Combined Arms Company.

• *Preferred Structure*

Throughout the text of this report, reference has been made to the most probable future threat as the predominant consideration in creation of an optimal 900 man infantry battalion. Accordingly, the infantry battalion of the 1980's must

be vested with the essential elements of combat power that will enable it to effectively counter and defeat this threat. At the same time, though, the infantry battalion of the eighties must also be capable of operations within more restrictive environs, such as MOBA or counter-guerrila campaigns. These possible applications must be just as rigorously considered in the selection of a preferred structure.

In order to balance the competing demands for a unit which can fight the already identified armor threat and still fight guerrillas or street-to-street, three elements must be blended:

(1) The unit must possess sufficient anti-armor and air defense means to engage these likely threats;

(2) The unit must possess a light infantry nature (thereby precluding organic mechanization), making it capable of employment in terrain accessible only on foot; and

(3) For the near-term, it must continue to rely on non-organic means via task organization to further enhance its mobility, provide it mechanization, weight its anti-armor strength to greater levels, and provide its long-range fires.

The structure which most strongly meets all of these criteria is option "C."

•• *Detailed Discussion*

Structure "C" is a 916 man infantry battalion consisting of 47 officers and 869 enlisted Marines (plus

USN personnel). It is comprised of a Headquarters and Service Company, a Combined Arms Company of significant strength, three full-strength Rifle Companies and a Special Infantry Troop which can be described as a fourth Rifle Company, less its Weapons Platoon.

This battalion is armed with a potent mix of short, medium, and long-range anti-armor weapons plus an austere organic air defense capability. This weapons system blend is configured in direct response to the most likely threat and is of sufficient density to engage and defeat the fighting elements of two Motorized Rifle Battalions, as indicated by figure VII-10.

STRUCTURE	OPPOSING FORCE % DESTRUCTION	
	1 MRB	2 MRB
Current	60%	30%
Current + 1 TOW Section	122%	61%
Study Structure Alternative	186%	93%

Figure VII-10 - Anti-armor Weapons Destruction Capability

Additionally, it is armed with a highly lethal but lightweight blend of indirect fire mortars. It contains a significantly enhanced array of direct-fire, small arms (including light and medium-weight machine guns) and assault weapons, from which subordinate commanders may select to appropriately weight their attacks against the immediate threat. These

weapons ensure simultaneous flexibility and firepower capability.

Structure "C" provides the commander with an enhanced maneuver capability. The creation of a fourth maneuver element ensures adequate reserve mission and security strength to allow the three full Rifle Companies to be employed at full potential.

All supporting units (i.e., crew-served weapons) at all levels (battalion and company) are organized in such a fashion that each contains primary sections (or squads) in numbers equal to the numbers of maneuver units they are intended to support. This provides, as a minimum, one section (or squad) per forward deployed maneuver unit, plus one remaining to either weight fire missions or to directly support a committed reserve.

Structure "C" incorporates additional assets in the critical functions of operations and logistics. It provides sufficient flexibility to absorb the personnel impacts of approaching MTACCS subsystems. It responds to the administrative and legal needs indicated as essential by field commanders. Lastly, it continues to provide adequate capability to perform those service functions essential to unit readiness.

•• *Rifle Company*

Figure VII-11 is an organizational diagram of the preferred structure's three Rifle Companies.

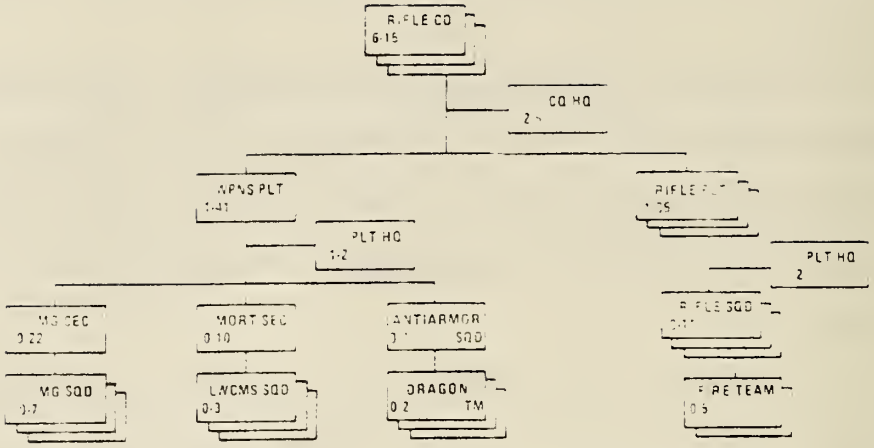


Figure VII-11

(1) Company Headquarters

The Rifle Company, Company Headquarters consists of two officers and five enlisted Marines, as follows:

BILLET	GRADE	MOS	WEAPON
Company Commander	Capt	0302	P
Company XO	Lt	0302	P
First Sergeant	1st Sgt	9999	P
Company Gunnery Sergeant	GySgt	0369	P
Admin Clerk	LCpl	0151	M
Messenger/Scout	Pvt	0311	M40A1
Messenger/Scout	Pvt	0311	M40A1

Enhancement of the Rifle Company, Company Headquarters is manifested in the form of:

(a) Addition of one Lance Corporal, Administrative Clerk (0151) to process company level correspondence and serve as a functional unit liaison to the battalion S-1 section;

(b) Assignment of two Privates as Messenger/Scouts (0311) to serve the normal functions of combat messenger, radio operator, and/or driver. Additionally, these two

Marines will be assigned additional duties as scouts and as a two-man sniper team, each armed with the M40A1, 7.62mm, sniper rifle. Although this seems to be a large variety of duties, it is noted that the use of either or both of these Marines as scouts/snipers would be intermittent. By virtue of this designation, however, the capability becomes inherent, and the persons so assigned constitute a nucleus of local instructors for expansion of this capability as needed.

(2) Rifle Platoon

The rifle platoon(s) consist of 1 officer and 35 enlisted Marines as shown below:

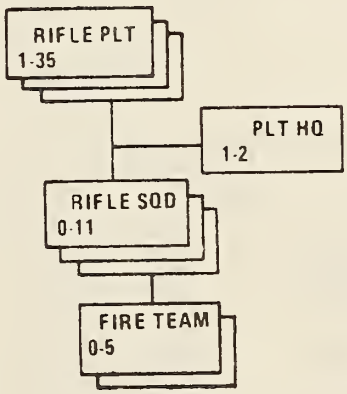


Figure VII-12

a) Platoon Headquarters

The platoon headquarters consists of one officer and two enlisted Marines, as follows:

BILLET	GRADE	MOS	WEAPON
Platoon Commander	Lt	0302	P
Platoon Sergeant	SSgt	0369	P
Messenger	Pvt	0311	M

This headquarters does not include a platoon guide (Sgt-0311). Although the duties of a guide were recognized, this billet and its attendant responsibilities can be effectively absorbed by the joint efforts of the Platoon Sergeant, messenger, and Platoon Corpsmen, if attached. Addition of the Platoon Guide billet would require an increase of 12 Marines in battalion strength.

(b) Rifle Squad

The rifle squad consists of eleven Marines, organized into two five-man fire teams, as follows:

NO.	BILLET	GRADE	MOS	WEAPON	FUTURE WEAPON
1	SQUAD LEADER	Sgt	0311	M16	M16
2	FIRE TEAM LEADER	Cpl	0311	M16	M16
2	Automatic Rifleman	LCpl	0311	M16	SAW
2	Grenadier	Pvt	0311	M203	M203
2	Assault Rifleman	Pvt	0311	M203	M16 w/RAW
2	Rifleman	Pvt	0311	M16	M16

As discussed in preceding sections of this report, the eleven man squad with two-five man fire teams is a capable organization. As depicted above, the fire teams would be organized with two M203 grenadiers. As the Squad Automatic Weapon (SAW) and the Rifleman's Assault Weapon (RAW) become available, the automatic rifleman will be assigned the SAW and one grenadier will be redesignated as an assault rifleman, equipped with RAW projectiles.

The net effect of this organization is to presently increase the M203 density from three to four per squad. This

need was discussed in both the Weapons System Analysis section and the Analysis of Military Organizational Effectiveness (AMORE) presentations. Ultimately, the 11-man squad will be equipped with two SAW's (one per fire team). These weapons system combinations dramatically increase the firepower potential of the Marine Rifle Squad.

(3) Weapons Platoon

The rifle company Weapons Platoon consists of 1 officer and 41 enlisted Marines, as shown below:

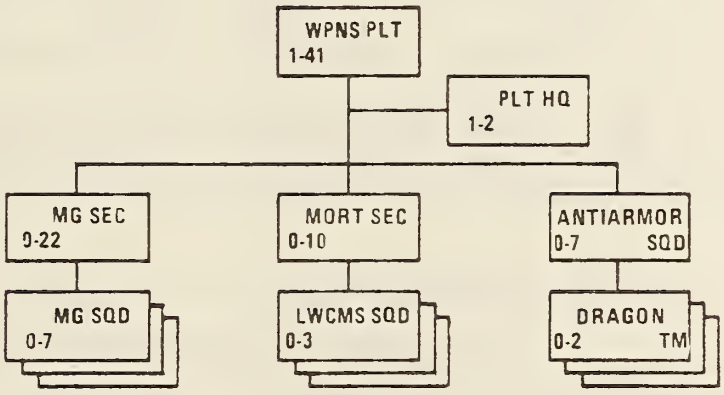


Figure VII-13

(a) Weapons Platoon Headquarters

The Weapons Platoon Headquarters is unchanged from the "I" Series T/O, as follows:

BILLET	GRADE	MOS	WEAPON
Platoon Commander	Lt	0302	P
Platoon Sergeant	GySgt	0369	P
Messenger	Pvt	0311	M

(b) Machine Gun Section

The Weapons Platoon Machine Gun Section is unchanged from the "I" Series T/O, as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	Section Leader	SSgt	0369	P
3	Squad Leader	Sgt	0331	M
6	MG Team Leader	Cpl	0331	M
6	Gunner	LCpl	0331	P
6	Ammo man	Pvt	0331	M

1 M60, 7.62mm Machine gun per MG Team
2 M60, 7.62mm Machine guns per MG Squad
6 M60, 7.62mm Machine guns per MG Section

(c) Mortar Section

The Weapons Platoon Mortar Section is unchanged in organization from the "I" Series T/O, as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	Section Leader	Sgt	0341	M
3	Squad Leader/Gunner	Cpl	0341	P
3	Ass't Gunner	LCpl	0341	P
3	Ammo Man	Pvt	0341	M

1 M19, 60mm mortar (FUTURE-XM224, LWCMS) per Squad
3 M19, 60mm mortar (FUTURE-XM224, LWCMS) per section

This structure will not have to change in respect to personnel requirements as a result of the pending delivery of the XM224, 60mm Light Weight Company Mortar System (LWCMS).

(d) Anti-Armor Squad

Previously, this element of the Weapons Platoon was designated as the Assault Section. As discussed in the Weapons System Analysis section, the M202 Multi-Shot Portable Flame Weapon (MPFW) will be removed from the inventory and replaced with the Shoulder-launched Multipurpose Assault Weapon (SMAW). This study has recommended that the SMAW configuration to be adopted be the one-tube, throw-away version, to be issued as an ordnance item. Acceptance of this recommendation will provide an assault weapon capability which can be applied in varying densities (vis-a-vis the immediate threat) throughout the rifle company, such as the M72 Lightweight Anti-Armor Weapon (LAAW) is currently employed. In so doing, deletion of the prior assault section is possible, and sufficient personnel became available to create an anti-armor squad.

Prior discussions of the likely future threat establish the need for increased anti-armor assets of medium and long-range capability. Creation of an anti-armor squad at the Rifle Company level responds directly to recognition of that threat. It is noted, however, that this same squad can just as effectively be armed with assault weapons systems (SMAW), if that need should be present and more probable. This illustrates the concept of "task weaponization" discussed in the Weapons System Analysis. However, the relative system complexity and subsequent training proficiency required of DRAGON

(anti-armor) versus SMAW (assault) mandates that the transition be *from DRAGON to SMAW*. Hence, this element is armed and trained with the DRAGON, but maintains the potential to be "task weaponized" with SMAW. Furthermore, at such time as a suitable assault weapon is available, DRAGONs could be relocated or removed from the manned structure, thus freeing spaces to man assault weapons, if needed.

The Anti-armor (assault) Squad is organized as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	Squad Leader	Sgt	0352	M
3	Gunner	Cpl	0352	M
3	Ass't Gunner	Pvt	0352	M

3 DRAGON missiles per Team
9 DRAGON missiles per Squad
1 Day tracker per Team (3 per Squad)
1 Night tracker per Team (3 per Squad)

Alternate Weapons Systems:

SMAW
RAW

This organization resolves an apparent void which exists within the "I" Series T/O DRAGON Platoon as it exists today. There appears to be no billet within the infantry battalion for a Sergeant (0352). The DRAGON Platoon possesses Corporals (0352), but the DRAGON Section Leader is a Staff Sergeant (0369). A Squad Leader's billet, heretofore, did not exist.

(4) Rifle Company Summary

UNIT STRENGTH: 6-151

COMPONENTS:

- Company HQ
- 3 Rifle Platoons

  3 Rifle Squads per Platoon
  (11-man Squads)

  2 - 5 Man Fire Teams per Squad

- Weapons Platoon

  Machine Gun Section
  (3-7 Man Squads)

  Mortar Section
  (3-3 Man Squads)

  Anti-armor (Assault) Squad
  (3-2 Man Teams)

WEAPONS	CURRENT	FUTURE
Pistol (.45 or 9mm)	33	33
M16	111	111
M203	36	18
M40A1	2	2
SAW	--	18
RAW	--	Munition
M60, 7.62mm, MG	6	6
M19, 60mm Mortar	3	--
XM224, 60mm, LWCMS	--	3
M47 DRAGON	9	9
LAAW	Munition	--
VIPER	--	Munition
SMAW	--	Munition

•• *Combined Arms Company*

Figure VII-14 depicts an organizational diagram of the preferred structure of the Combined Arms Company.

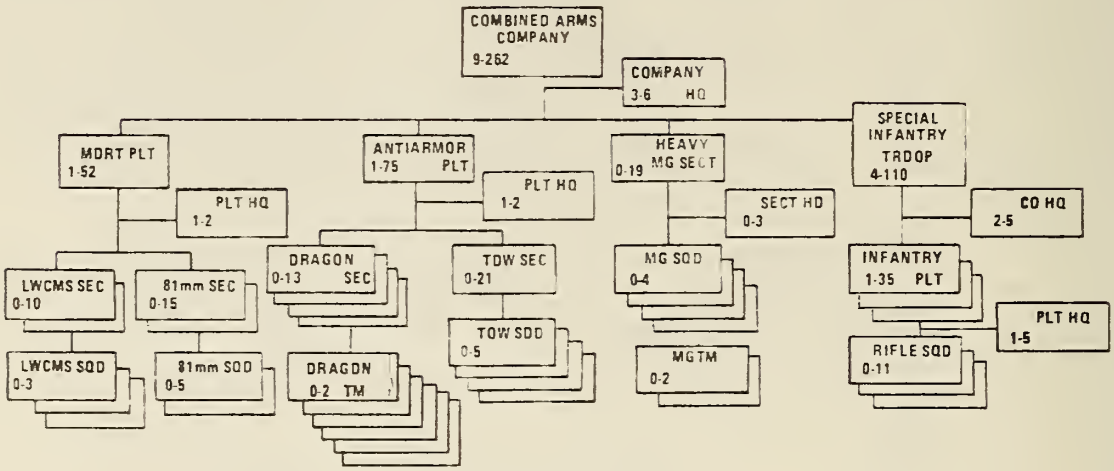


Figure VII-14

(1) Company Headquarters

The company headquarters consists of three officers and six enlisted Marines, as is shown below. This headquarters is organized to control the diverse elements and roles of the Combined Arms Company.

(a) The Company Commander functions in combat as the Fire Support Coordinator (FSC) of the battalion. As such, he is located in the S-3, Fire Support Coordination Center.

BILLET	GRADE		WEAPON
Company Commander	CAPT	0302	P
* Company XO	CAPT	0302	P
Co. Operations Officer	LT	0302	P
First Sergeant	1ST SGT	9999	P
Operations Chief	MSGT	0369	P
Supply Sergeant	SGT	0311	M
Admin Clerk	LCPL	0151	M
Messenger/Driver	PVT	0311	M
Messenger/Driver	PVT	0311	M

*Serves as the Combined Arms Company Executive Officer and as the Special Infantry Troop Commander.

(b) The Company Executive Officer, similarly fills a special combat role, serving as the Special Infantry Troop Commander.

(c) The Company Operations Officer provides headquarters liaison and coordinates the needs of all company subordinate units, in combat.

(d) The Lance Corporal, Administrative Clerk (0151) processes company level correspondence and serves as a functional unit liaison to the battalion S-1 section;

(e) All other billets assume responsibilities as they presently exist as per the "I" Series T/O (Weapons Company).

(2) Special Infantry Troop

This unit is identically structured to the rifle companies previously discussed, with two exceptions:

(a) It does not possess a weapons platoon.

(b) The unit headquarters consists of an Executive Officer (Lt/0302). The Commander is also the Combined Arms Company Executive Officer.

The role of this unit must not be misconstrued. It provides the battalion commander with a lightweight, fourth maneuver element which can be "task-organized" or "task weaponized" as necessary to be employed in many tactical roles. Its existence allows the battalion commander to fight with three companies up and simultaneously retain a potent reserve.

The Special Infantry Troop can easily be tasked as the battalion's mechanized infantry force which remains mounted in attached Assault Amphibian Vehicles (AAV's). It can quickly be task-organized with various Combined Arms Company weapons types (each type is structured to accomodate this eventuality) to assume the mission of any frontline rifle company. It can rapidly be displaced to weight or support any unit about the battlefield without the encumbrance of organic crew-served weapons to weight it down. It can provide a sizable combat outpost (COP) force and is ideally suited as a rifle unit to conduct combat patrolling. This special element can also provide security for command posts (CP's) and support unit locations, if not being employed as a reserve force.

(3) Mortar Platoon

The Mortar Platoon consists of one officer and 52 enlisted Marines as shown below:

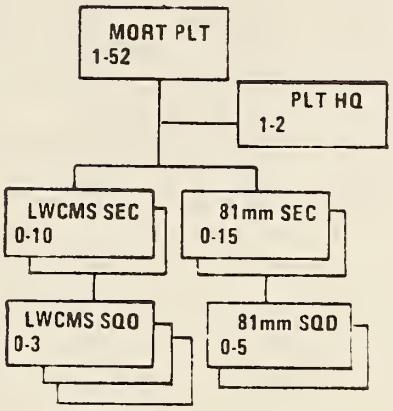


Figure VII-15

The Mortar Platoon is a hybrid, combining both the 81mm Mortar and the XM224, 60mm mortar into four sections - one to support each maneuver element. The platoon contains 4-81mm mortars (2 per section) and 6-60mm (XM224) mortars for a total of 10, as opposed to 8 mortars in the "I" Series T/O.

This structure offers increased indirect fire effectiveness, enhanced mobility, and greater weapons type density. It does so with the added bonus of considerable personnel savings which have been instrumental in forming the fourth maneuver element for the battalion.

The weapons system analysis addressed the relative merits of each mortar type. WEI/WUV methodology, which aggregates mortar system firepower, mobility, survivability, and fire direction control factors into an effectiveness score, indicates that the mix of mortars as presented herein is 15.13% more powerful than a platoon of eight 81mm mortars. Figure VII-16 graphically depicts these relative values.

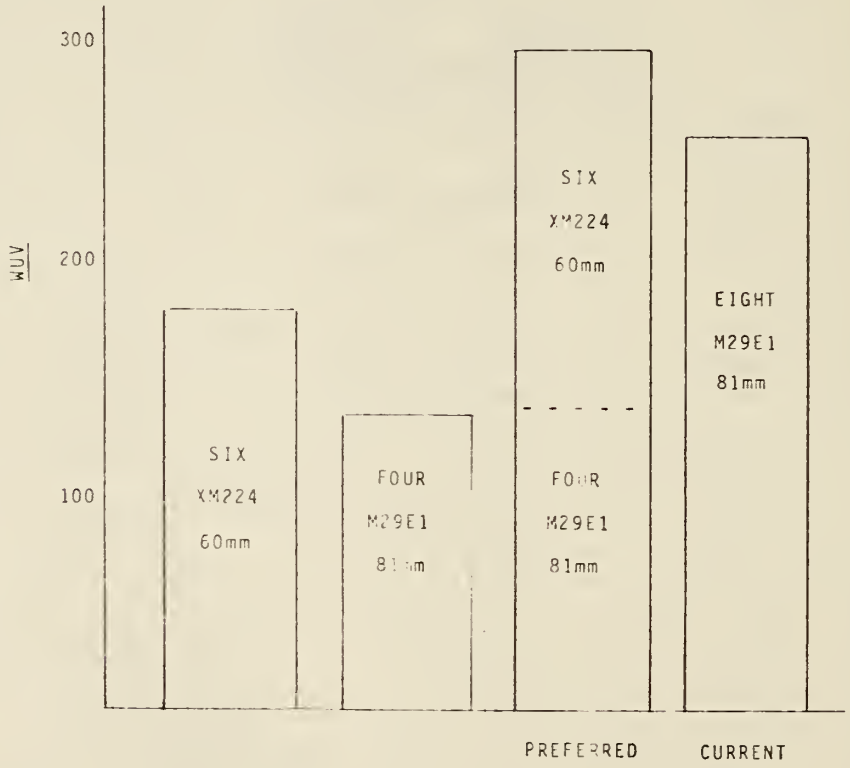


Figure VII-16 - Infantry Mortars
Weighted Unit Value Comparison

The effort to displace and move the XM224, 60mm LWCMS is significantly less than with the 81mm mortar. In a fast paced tactical environment, the XM224 can be echeloned rapidly, thus

reducing degradation of total battalion level indirect fire support during displacement of the 81mm sections.

Lastly, the "I" Series T/O requires 82 officer and enlisted Marines to man the 81mm mortar platoon. The proposed structure requires only 53 officers and enlisted Marines. The austere 900 man ceiling makes this factor significant.

(a) Mortar Platoon Headquarters

The platoon headquarters consists of one officer and two enlisted personnel, as follows:

BILLET	GRADE	MOS	WEAPON
Platoon Commander	LT	0302	P
Platoon Chief	GYSGT	0848	P
Ammunition Tech	CPL	2311	M

In addition, three enlisted Marines from the Communications Platoon are designated as the Mortar Laison Party, providing platoon headquarters communications and wire support.

(b) 81mm Mortar Section

The 81mm Mortar Section is organized into a five man Section Headquarters and two-5 man mortar squads. This is the same structure as the "I" Series T/O, except two ammunition men have been removed from each squad. In addition, three enlisted Marines from the Communications Platoon are designated as the Mortar (Communications) Team for each section of mortars, providing section communications and wire support.

NO.	BILLET	GRADE	MOS	WEAPON
	HQ			
1	Section Leader	SSGT	0369	P
1	Ammo NCO	CPL	0341	M
2	Ammo Man/Drvr	LCPL	0341	M
1	Forward Observer	SGT	0341	M
	SQUAD			
2	Squad Leader	CPL	0341	M
2	Gunner	LCPL	0341	M
2	Ass't Gunner	LCPL	0341	M
4	Ammo Man	PVT	0341	M
4, M29E1, 81mm Mortars 2, M29E1, 81mm Mortars per Section				

(c) XM224, 60mm, LWCMS Section

The LWCMS Section is organized into three-three man mortar squads plus a Section Leader. Each of the two sections in the Mortar platoon is identical to that resident within the Weapons Platoon of the battalion's Rifle Companies.

In addition, three enlisted Marines from the Communications Platoon are designated as the Mortar (Communications) Team for each section of mortars, providing section communications and wire support.

(4) Anti-Armor Platoon

As with the Mortar Platoon, the Anti-Armor Platoon of the Weapons Company is a hybrid organization, as depicted in figure VII-17.

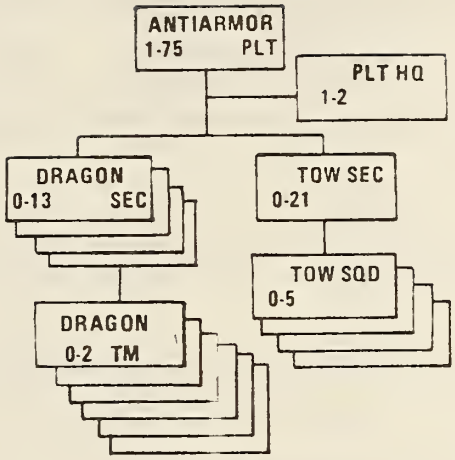


Figure VII-17

The addition of TOW to the infantry battalion significantly enhances the survivability of the battalion in an armor-intense environment.

As indicated in previous discussions, the destruction capability of the "I" Series T/O against armored targets is seriously curtailed due to short engagement ranges, enemy armor density, and closure rates. The assets of Structure "C" as shown herein can provide a margin of destructive capability to establish the infantry battalion as a more potent force within this adverse environment. Figure VII-18 synopsizes the increase in this capability which Structure "C" produces.

STRUCTURE	OPPOSING FORCE % DESTRUCTION 1 MRB	2 MRB	TIME FRIENDLY FORCES CAN ENGAGE MRB
"I" Series T/O	60%	30%	4-6 Minutes
Structure "C"	186%	93%	15-22 Minutes

Figure VII-18 - Anti-armor Comparison

(a) Anti-Armor Platoon Headquarters

The platoon headquarters consists of one officer and two enlisted Marines:

BILLET	GRADE	MOS	WEAPON
Platoon Commander	LT	0302	P
Platoon Sergeant	GYSGT	0369	P
Messenger/Drvr	PVT	0311	M

(b) DRAGON Section

Each of the Anti-armor Platoon's four DRAGON Sections is organized into six two-man teams (one-half a section is the same as the anti-armor squad of the Weapons Platoon of the Rifle Company) and a Section Leader:

NO.	BILLET	GRADE	MOS	WEAPON
1	Section Leader	SSGT	0369	P
6	Gunner	CPL	0352	M
6	Ass't Gunner	PVT	0352	M

3 DRAGON missiles per team
18 DRAGON missiles per section
72 DRAGON missiles per platoon
1 Day Tracker per team (6 per section)
1 Night Tracker per team (6 per section)

(c) TOW Section

The Anti-armor Platoon's TOW Section consists of four squads (one to support each maneuver element) and a Section Leader. This section is identical to that in the Antitank Company of the Infantry Division's Tank Battalion.

NO.	BILLET	GRADE	MOS	WEAPON
1	Section Leader	SSgt	0369	P
4	Squad Leader	Sgt	0352	M
8	Gunner	Cpl	0352	P
8	Driver/Gunner (Asst Driver/Gunner)	Pvt	0352	M

2 TOW launchers per squad
8 TOW launchers per section
10 TOW missiles per squad
40 TOW missiles per section
3 M151A2 jeeps per squad (one M416 trailer/squad)
13 M151A2 jeeps per section (four M416 trailer/section)

(5) Heavy Machine Gun Section

The Heavy Machine Gun Section consists of four squads (one to support each maneuver element, if required) which are each organized into two teams of two men each. There is also a three man section headquarters.

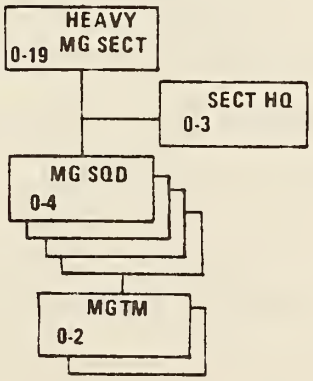


Figure VII-19

The section is organized as follows:

NO.	BILLET	GRADE	MOS	WEAPON
	HQ			
1	Section Leader	GYSGT	0369	P
1	Messenger	LCPL	0331	P
1	Messenger/Driver	PVT	0331	P
	TEAM			
8	Team Leader/Gunner	CPL	0331	M
8	Assistant Gunner	LCPL	0331	M
Weapons:				
	1 M2 .50 Caliber MG per Team			
	8 M2 .50 Caliber MG per Section			

This section was created in direct response to the increasingly probable likelihood of having to fight a ground battle in three-dimensions: to the front, flanks, and overhead. This section is placed within the battalion for several reasons: to ensure sufficient timely response in acquisition and engagement of low-flying, helicopter aircraft, such as the Soviet HIND-D; it extends the battalion's standoff distance and adds direct fire weapons with ranges compatible with the battalion's mortar assets; it enhances anti-armor capability by adding weapons able to deliver the SLAP round; and it dedicates structure for the possible introduction of new weaponry as it becomes available.

The Heavy Machine Gun Section does not use organic transportation for its weapons, although transportation is clearly

required. Sufficient vehicles already exist in the battalion to permit their dual use as weapon carriers; since the Anti-Armor Platoon will require an increase (13) in the number of organic vehicles, further growth in motor transport assets becomes undesirable without considerably enlarging associated logistic support.

The addition of this unit provides a significant broadening of battalion capability in a variety of mission roles.

(6) Combined Arms Company Summary

UNIT STRENGTH: 9-262

COMPONENTS:

- Mortar Platoon
  4 Sections
- Anti-Armor Platoon
  4 Sections medium-range
  4 Squads long-range
- Heavy Machinegun Section
  4 Squads
- Special Infantry Troop

WEAPONS	CURRENT	FUTURE
Pistol (.45 or 9mm)	40	40
M16	213	213
M203	18	9
SAW	--	9
RAW	--	Munition
M19, 60mm Mortar	--	--

(cont.)

WEAPONS	CURRENT	FUTURE
XM224, 60mm LWCMS	6	6
M29E1, 81mm	4	4
M47 DRAGON	72	72
M220 TOW (ITOW)	40	40
M2 .50 Cal MG	8	0
REDEYE/STINGER (STINGER POST)	--	32
LAAW	Munition	--
VIPER	--	Munition
SMAW	--	Munition

●● *Headquarters and Service Company*

Figure VII-20 provides an organizational diagram of Structure "C"'s Headquarters and Service (H&S) Company.

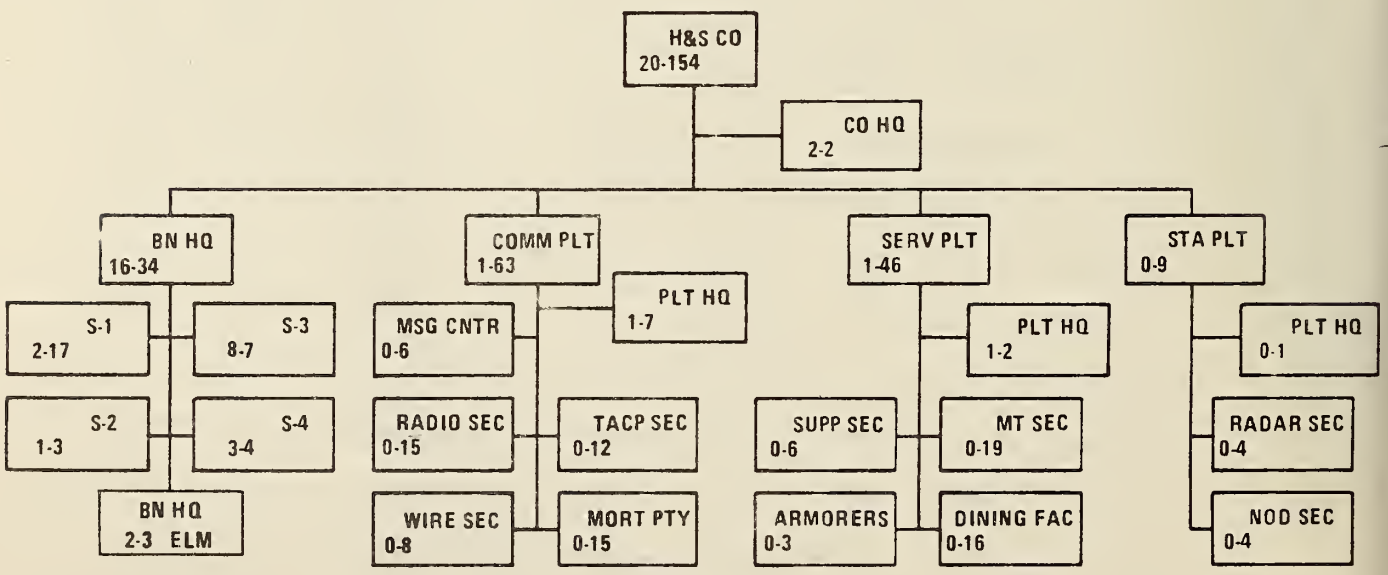


Figure VII-20

(1) Battalion Headquarters

No change.

NO.	BILLET	GRADE	MOS	WEAPON
1	Commanding Officer	LTCOL	0302	P
1	Executive Officer	MAJ	0302	P
1	Sergeant Major	SGTMAJ	9999	P
2	Messenger/Drvr	PVT	0311	M

(2) S-1/Adjutant Section

Some slight realignment of this section has been incorporated into the preferred structure, largely as a result of consistent FMF suggestions, and the pressing competing demands for manpower spaces. The following changes have been instituted:

(a) Deletion of the 8421, Staff Sergeant Career Planner (8421). It is recommended that this responsibility be placed under the cognizance of the battalion Sergeant Major, and that the billet be reconstituted at a higher, consolidated level (Regiment or Division);

(b) Deletion of five Administrative Clerks (0151), and reassignment of one to each Rifle Company, to the Special Infantry Troop, and to the Combined Arms Company Headquarters (net effect is no personnel or skill loss to the battalion);

(c) Addition of two Legal Services Men to constitute a Legal Section.

The S-1/Adjutant Section is organized as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	S-1/Adjutant	LT	0302	P
1	Ass't S-1/Adjutant	WO	0170	P
1	Pers Admin Chief	GYSGT	0193	P
1	Pers Chief	SSGT	0193	P
1	Ass't Pers Chief	SGT	0121	M
1	Pers Clerk	CPL	0121	M
1	Pers Clerk	LCPL	0121	M
2	Pers Clerk	PVT	0121	M
2	Unit Diary Clerk	CPL	0131	M
2	Unit Diary Clerk	LCPL	0131	M
1	Unit Diary Clerk	PVT	0131	M
1	Admin Clerk	SGT	0151	M
1	Admin Clerk	CPL	0151	M
1	Admin Clerk	PVT	0151	M
1	Legal Services Man	CPL	4421	M
1	Legal Services Man	PVT	4421	M
	2-17			
	(5 Additional LCPL 0151's in Rifle Company, Special Infantry Troop, and Combined Arms Company Headquarters)			

(3) S-2 Section

No change.

NO.	BILLET	GRADE		WEAPON
1	S-2	CAPT	0202	P
1	Intell Chief	GYSGT	0231	P
1	Intell Ass't	SGT	0231	M
1	Intell Ass't/Drvr	PVT	0311	M

(4) S-3 Section

The only changes to this section have been the addition of two NBC Specialist (5711) billets, in recognition of a critical skill requirement. The section is organized as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	S-3	MAJ	0302	P
1	Ass't S-3	CAPT	0302	P
2	Liaison Officer	LT	0302	P
1	Ass't S-3/Air Officer	CAPT	7207	P
2	Ass't S-3/FAC	LT	7207	P
1	Inf Opns Chief	MSGT	0369	P
1	Inf Opns Ass't	SSGT	0369	P
1	NBC Officer	LT	9910	P
1	NBC Specialist	SGT	5711	M
2	NBC Specialist	CPL	5711	M
1	Topog Draftsman	LCPL	1431	M
1	Messenger/Drvr	PVT	0311	M

(5) S-4 Section

The only change to this section is the addition of one Embarkation Officer (0430) in response to the increasing complexity of future rapid deployment, prepositioning, and strategic air and sealift plans. The section is organized as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	S-4	CAPT	0402	P
1	Maint Mgmt Officer	LT	0402	P
1	Maint Mgmt Chief	SSGT	0441	P
1	Embarkation Officer	LT	0430	P
1	Embarkation Ass't	SGT	0431	M
1	Ammunition Tech	CPL	2311	M
1	Log Data Control Clerk	LCPL	0441	M

(6) Company Headquarters

The only change was deletion of the Supply Sergeant billet, considered redundant in view of the size of the company and the subordinate Service Platoon, Supply Section, component of the H&S Company (no Admin Clerk (0151) is provided for similar reasons). The headquarters is organized as follows:

NO.	BILLET	GRADE	MOS	WEAPON
1	Company Commander	CAPT/LT	0302	P
1	Executive Officer	LT	0302	P
1	First Sergeant	1st SGT	9999	P
1	Gunnery Sergeant	GYSGT	0369	P

Consideration may also be given to reducing the Commanding Officer's grade requirement to that of Lieutenant.

(7) Communications Platoon

The Communications Platoon has been slightly reconfigured to more smoothly accomodate the phasing of projected Marine Tactical Command and Control Systems (MTACCS). The most notable changes occur in the Wire and Radio Sections.

(a) The "I" Series T/O Wire Section required 14 personnel. However, closer inspection revealed that five additional wiremen were also listed with the Mortar Support Section. It was felt that some capability was essential at the battalion level, due not only to the degree of wiring and switchboard operation which occurs but also due to proposed

increased requirements for wiremen as a result of MTACCS. However, the need for 19 wiremen overstates the real requirement. Hence, the wire section was reduced to a total of 13 (including five assigned to the Mortar Support Section).

(b) The impact of MTACCS also projects a lesser requirement for Field Radio Operators, from 40 currently to 27 ultimately. Despite this considerable reduction projection, it was felt that the battalion, can not presently absorb such a drastic cut. Therefore, the number was reduced only by four. The inclusion of an additional messenger for each rifle company headquarters somewhat balances this reduction, as they can be trained as field radio operators.

(c) All other changes are minor and are incorporated in anticipation of future MTACCS requirements.

Figure VII-21 indicates the flow of changes from the "I" Series T/O through Structure "C" to the MTACCS projected requirement.

Hence, the Communications Platoon for Structure "C" is as shown in figure VII-22.

(8) Service Platoon

The Service Platoon has been slightly reconfigured from the "I" Series T/O. Changes are as follows:

(a) Deletion of two personnel from the Platoon Headquarters;

(b) Deletion of two personnel from the Supply Section;

BILLET	RANK	MOS	"I" SERIES	"C"	MTACCS PROJ'D
Plt Comm/Bn Comm O	Capt	2502	1	1	1
Comm Chief	MSgt	2591	1	1	1
Maintenance Chief	SSgt	2861	0	0 →	1
Radio Tech	SSgt	2861	2	1 →	0
Ground Radar Rprman	Sgt	2884 (5931)	2	2	2
Radio Rprman	Cpl	2841	2	1	1
Telephone-Teletype Tech	Cpl	2811	1	1 →	0
Telephone Rprman	Cpl	2811	0	0 →	1
Teletype Tech	Cpl	2818	1	1	0
Teletype Operator	Cpl/Pvt	2542	3	2	0
Digital Switch Rprmn	Cpl	28XX	0	0 →	1
Tactical Data Sys Rprmn	Cpl/LCpl	28XX	0	0 →	2
Message Center Chief	SSgt	2549	1	1 →	0
Message Center Man	Cpl/LCpl	2542	2	3 →	4
Wireman	Sgt-Pvt	2512	19	13 →	21
Field Radio Operators	Sgt-Pvt	2531	40	36 →	27
Radio Chief	SSgt	2537	1	1	1
	TOTALS		1-74	1-63	1-62

{ → Indicates Suggested Personnel Transitions as Marine Tactical Command & Control Systems (MTACCS) are incorporated into the infantry battalion

Figure VII-21 - Communications Platoon Series Transitions

NO.	BILLET	GRADE	MOS	WEAPON
	HQ			
1	Plt Cmdr/Bn Comm Officer	CAPT	2502	P
1	Communications Chief	MSGT	2591	P
1	Radio Tech	SSGT	2861	P
2	Grd Radar Rprman	SGT	2884	M
1	Radio Rprman	CPL	2841	M
1	Telephone-Teletype Tech	CPL	2811	M
1	Teletype Tech	CPL	2818	M
	MSG CNTR SECTION			
2	Teletype Operator (DVR)	CPL (PVT)	2542	M
1	Message Cntr Chief	SSGT	2549	P
3	Message Cntr Chief	CPL/LCPL	2542	M
	RADIO SECTION			
1	Radio Chief	SSGT	2537	P
1	Radio Supervisor	SGT	2531	M
3	Field Radio Operator	CPL	2531	P
4	Field Radio Operator	LCPL	2531	P
5	Field Radio Operator	PVT	2531	P
1	Field Radio Operator	PVT	2531	M
	WIRE SECTION			
1	Wire Chief	SGT	2512	M
1	Wire Supervisor	CPL	2512	M
2	Wireman	LCPL	2512	M
3	Wireman	PVT	2512	M
1	Wireman/Driver	PVT	2512	M
	TACT. AIR CNTL PTY SECTION			
	Tact Air Cntl Pty			
1	Field Radio Operator	CPL	2531	M
1	Field Radio Operator	LCPL	2531	P
2	Field Radio Opr/Drvr	PVT	2531	M
	Forward Air Cntl Pty			
2	Field Radio Operator	CPL	2531	M
4	Field Radio Operator	PVT	2531	P
2	Field Radio Operator	PVT	2531	M
	MORTAR SUPPORT SECTION			
	Mortar Liaison Party (W/Mortar Plt HQ)			
1	Field Radio Operator	CPL	2531	P
1	Wireman	LCPL	2512	M
1	Field Radio Operator	PVT	2531	P
	Mortar Team (4 Teams - 1 Per Mortar Section)			
4	Field Radio Operator	LCPL	2531	P
4	Field Radio Operator	PVT	2531	P
4	Wireman	PVT	2512	M
	TOTAL 1-63			

Figure VII-22 - H&S Company, Communications Platoon

(c) Deletion of the Lt (3502) Motor Transport Officer;

(d) Deletion of three Cooks from the Dining Facility Section. The Service Platoon is organized as in figure VII-23.

NO.	BILLET	GRADE	MOS	WEAPON
	PLT HQ			
1	Plt Cmdr/Bn Sup Officer	LT	3002	P
1	Supply Chief	SSGT	3043	P
1	Supply Admin Man	SGT	3043	M
	SUPPLY SECTION			
1	Chief Warehouseman	SGT	3051	M
1	Supply Admin Man	CPL	3043	M
1	General Warehouseman	CPL	3051	M
1	Supply Admin Man	LCPL	3043	M
1	General Warehouseman	LCPL	3051	M
1	Supply Admin Man	PVT	3043	M
	ARMORER SECTION			
1	Infantry Wpn Repariman	SGT	2111	M
1	Infantry Wpn Repairman	CPL	2111	M
1	Infantry Wpn Repairman	LCPL	2111	M
	TRANSPORTATION SECTION			
1	MT Section Chief	GYSGT	3529	P
1	Auto Mech	SGT	3521	M
1	Auto Mech	CPL	3521	M
1	MV Operator	CPL	3535	M
2	Auto Mech	LCPL	3521	M
4	MV Operator	LCPL	3535	M
8	MV Operator	PVT	3535	M
1	Auto Mech	PVT	3521	M
	DINING FACILITY SECTION			
1	Dining Facility Chief	GYSGT	3381	P
1	Cook	SSGT	3371	P
2	Cook	SGT	3371	M
2	Cook	CPL	3371	M
1	Baker	SGT	3311	M
5	Cook	LCPL	3371	M
1	Baker	LCPL	3311	M
3	Cook	PVT	3371	M
	TOTAL 1-46			

Figure VII-23 - H&S Company, Service Platoon

(9) Surveillance and Target Acquisition (STA) Section

This unit, traditionally manned by infantrymen (0369, 0311), retained a radar and night observation device (NOD) capability, although a full capability will require augmentation from other sources. The platoon is organized as shown below:

NO.	BILLET	GRADE	MOS	WEAPON
	PLT HQ			
1	Plt Cmdr/Radar Section Ldr	SSGT	0369	P
	RADAR SECTION (2 Teams)			
2	Radar Tm Leader	SGT	0311	M
2	Radar Operator	LCPL	0311	M
	NODS SECTION (4 Teams)			
4	Nod Operator	CPL	0311	M
	TOTAL 0-9			

(10) Chaplain Section

The Lance Corporal Admin Clerk (0151) has been deleted.

(11) Medical Platoon

The medical system in support of the Marine Corps ranges from individual corpsmen at the FEBA to the naval hospitals in CONUS. Those elements organic to the infantry battalion are contained in the medical platoon attached to H&S

Company. The medical platoon currently consists of two surgeons and 65 hospital corpsmen (all Navy personnel). The platoon is organized into a Battalion Aid Station (BAS) and four Company Medical Teams (CMT). These two element types provide different levels of care.

Usually, one corpsman of a CMT is assigned to each rifle squad to provide emergency first aid to the wounded or injured. Because he is required to stay as mobile as the rifle squad, he is limited in supplies and cannot provide protracted treatment. The corpsman performs the first level of triage at the FEBA; those not seriously wounded are returned to duty, while those requiring further treatment are moved rearward to the BAS.

The BAS provides emergency life saving treatment including initial resuscitation, establishing airways, and treatment for shock. The emphasis is to either return men to duty quickly or to evacuate casualties to the next treatment level.

At present, the four CMTs consist of eleven hospital corpsmen: one corpsman with each of the nine rifle squads with senior and reserve corpsmen at company headquarters. The two surgeons and remaining 21 corpsman comprise the BAS. To assess the impact of any changes in the infantry battalion structure the composition of the CMTs and the BAS must be addressed separately.

The total of CMT corpsmen is driven by the structure of the infantry battalion rather than by its total strength. The

assignment of one corpsman to each rifle squad should not be changed solely by virtue of a reduction in squad size from 13 to 11 men. If the squad were further reduced, there would still be serious problems in assigning corpsmen to some squads and not to others, or in tying two squads to one corpsman. The roles of the senior and reserve corpsmen are not reduced by smaller rifle squads either. Thus, the CMT should be maintained at eleven corpsmen per company.

The requirements for the BAS are based on battalion strength rather than structure. In combat, the 21 corpsmen in the BAS are often barely adequate. No objective analysis is possible because, at present, there are no casualty rate figures which reflect modern weapons and lethality. Furthermore, the impact of improved conventional munitions and the increasing probability of chemical casualties tend to increase the requirements for BAS personnel. In general, the fact that there will be a personnel decrease in the battalion will be more than balanced by an expected increase in the number of wounded, and the complication of multiple wounds. Structures which retain 36 rifle squads may well require more organic medical personnel, not fewer, or else suffer more died-of-wounds casualties for lack of timely treatment.

These considerations form the rationale for the recommended retention of current levels of medical support.

- *Long-Range Structuring*

The picture of the potential battlefield of the 1980's is becoming increasingly clear. Its nature is evolving to one of even greater lethality, fluidity, and swiftness than is expected today. Organizational structures of ground combat units will also, necessarily, continue to evolve in response to the changing nature of the threat.

In order to minimize the trauma associated with radical change, an orderly process for evolution of combat unit structures should be planned which will result in steadily improving readiness across the transition period. Inherent to such a process is the need to establish long-range goals intended to satisfy future threat requirements. This implies that, as a goal, the battalion organizational structure adopted for 1980 should provide the framework for development of a new structure which will eventually be required by 1990.

This study, in an attempt to initiate such a progression, has synthesized an infantry battalion target structure intended to serve as a guide which structure planners can follow over the next transitory decade. This model structure is based upon reasonable interpretation of the nature and severity of the future threat, and upon reasonable consideration of the Marine Corps' ability to flexibly adjust, design, and adapt its resources in the interim.

- *Structure "D"*

Structure "D" is a conceptual infantry battalion suggested for the late 1980's or early 1990's. Evolving from this study's preferred structure ("C"), it provides considerable enhancement of firepower, mobility, and target acquisition capability but requires no corresponding increase in manpower. Thus, over the next decade, infantry combat power can grow as a result of technology and technique, not personnel.

Transition from structure "C" to the long-range structure "D" can be achieved with a minimal degree of personnel and organizational turbulence:

•• The Anti-armor Platoon of structure "C" can be reconfigured by adding mechanized platforms to provide mobile anti-armor capability in the form of a Fighting Vehicle Platoon.

•• The Heavy Machinegun Section of structure "C" provides range enhancement, anti-armor potential, and air defense capability. Through the next decade, weapons will be introduced to the battalion to further enhance its anti-armor and standoff characteristics. As this occurs, reliance on the .50 caliber for these functions will be less, and the weapon will be available a greater portion of the time for air defense (fortunately so, because the air threat will be growing at the same time). By 1990, the main function of the Heavy Machinegun Section might well be air defense; it would be appropriate at that time to discard the .50 caliber machine guns in favor of

STRUCTURE "D"

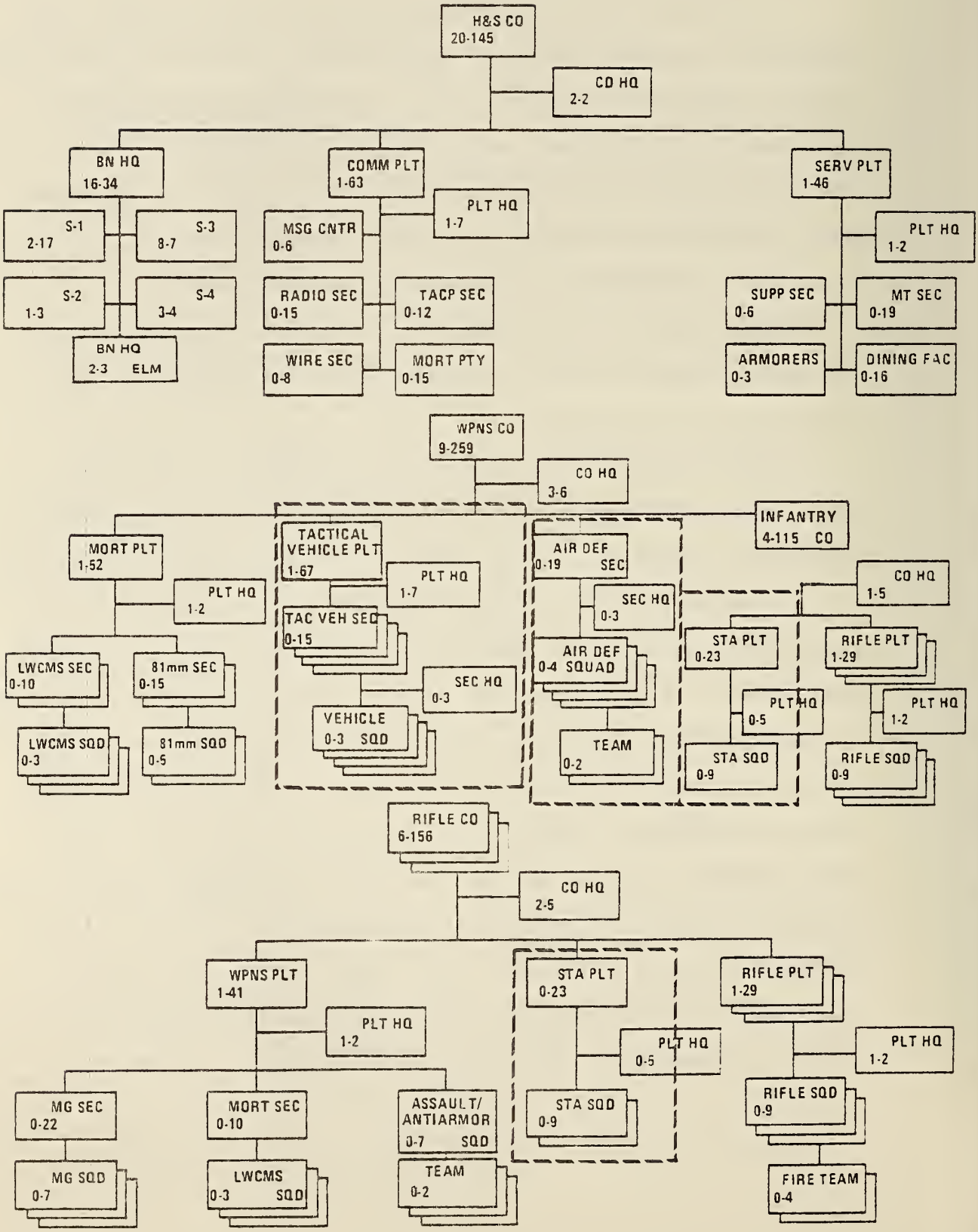


Figure VII-24

dedicated air defense weapons (either guns or missiles). A unit of 19 Marines could thus be made available to staff this air defense section, if such is justified at that time.

•• The infantry companies of structure "C," by reconfiguring 11-man rifle squads into 9-man rifle squads, can create a Surveillance Target Acquisition capability modeled around the Marine Combat Electronic System (MARCES) formulated in the early 1970's. Although MARCES was never adopted, the state of technology by 1990, and the advent of MTACCS, suggest that it will become more valid as the decade ages.

•• The remaining essential elements of structure "C" are unchanged in structure "D."

Constant threat-versus-capability reexaminations will be required throughout the decade. These will better determine the exact nature and content of a 1990 structure. Nonetheless, structure "D" provides an initial design towards which the Marine infantry battalion, bolstered by other new concepts, such as Maritime Prepositioning, is evolving.

Recommendations

As a result of the analyses, discussions, and study involved in this examination of the Marine infantry battalion table of organization, the following are recommended:

(1) *That the Marine infantry battalion for the 1980's be patterned after the preferred battalion configuration (Structure "C") discussed in this report.*

(2) *That the development (if necessary), acquisition, and fielding of an infantry assault weapon be done with the greatest possible speed and highest priority.*

(3) *That if additional manpower spaces above those of Structure "C" become available for the infantry battalion, first priority for their assignment be given to the areas of logistics and combat service support.*

(4) *That long term potential Marine infantry employment possibilities be continually reviewed vis-a-vis the 1980 battalion structure to ensure that future modernizations can be anticipated and be incorporated naturally instead of turbulently, which can erode readiness, efficiency and morale.*

(5) *That the Commanding General, Marine Corps Development and Education Command, or some other command or agency, be assigned the responsibility and resources for constant and continual examination of the threat-versus-capability balance, and be charged to recommend structure modifications consistent with shifts in that balance.*

VIII. FMF RESPONSES

FMF Responses (to the Final Draft for Review)

Following is a discussion of those major issues and their specific points of concern precepitated by major FMF command respondents to the Final Draft for Review. This draft report was prepared and delivered to major FMF commands during April 1980 soliciting their input to its contents. As would be expected, interest was high and responses generally reflected this interest.

A review of these responses revealed that concerns were of two natures: (1) topical and (2) issues. Topical concerns essentially dealt with singularly individual items, such as the inclusion or exclusion of a particular billet (e.g., Chaplain's Assistant or Bachelor Housing Enlisted Personnel Manager). Each of these topical matters was considered by the study group and adjustments made to the final structure when deemed appropriate (e.g., a TOW Technician (MOS 2875) was recommended and consequently incorporated into Structure "C").

Other concerns were of a broader nature and classified as issues. The study group determined that these matters were of such import as to require a more detailed explanation in this report, to include design philosophy, employment characteristics, and analytical, as well as judgmental, rationale for these elemental characteristics of Structure "C". These issues are presented herein, and discuss in a bit more depth those five deemed as of greatest import:

- Mortar Platoon
- Anti-Armor Platoon
- Special Infantry Troop
- Communications Platoon
- Logistics/Maintenance/Supply/Mortar Transport Supportability

As indicated in each discussion, adjustments as considered prudent, were made in the final version of Structure "C".

ITEM: Mortar Platoon, Combined Arms Company

DISCUSSION: The Combined Arms Company Mortar Platoon was addressed by all FMF respondents. Major concerns are discussed below:

Communications

Initially, it is necessary to recall that the size of the mortar platoon as it has traditionally been known is substantial--2 officers and 94 enlisted personnel ("M", "X", and "I" Series T/Os). Of these, 15 enlisted personnel have been communicators (10 radio operators and 5 wiremen). Originally, these 15 communicators were assigned to the mortar platoon. With the inception of the "I" Series T/O, they were redesignated as the Mortar Support Section in the Communications Platoon, with no change in strength or composition. The "I" Series T/O mortar platoon then had 2 officers and 80 enlisted personnel, plus 15 communicators in the Mortar Support Section (NOTE: The "X" and "I" Series T/O added an Ammunition Tech (Cpl 2311) to the Platoon Headquarters), for a strength of 2-95 including communicators.

Structure "C" of this study retains all 15 communicators in the Mortar Support Section in the Comm Platoon. This provides 3 communicators per mortar section, plus 3 for the mortar platoon headquarters, which is exactly the support provided for all previous mortar platoon T/O's (X, I, and M).

Mortar Platoon Headquarters Structure

The platoon headquarters of the mortar platoon as appears in this report is at a strength of 1-2. Traditional T/O's have listed the strength as 2-6; however, 3 of these personnel were communicators (see above). Structure "C" also has 3 communicators for this headquarters (the Mortar Liaison Party of the Mortar Support Section of the Comm Platoon). Hence, its operating strength is actually 1-5, compared to an operating strength of 2-6 for M and X Series T/O. Structure "C" eliminated the billet of Assistant 81 mm Mortar Platoon Commander due to the presence of the Combined Arms Company Commander, acting as the battalion's FSC, within the FSCC. This diminishes the operational demands normally made of the Artillery Liaison Officer who can now conduct his own unit's plans and fires and can monitor and clear mortar missions, as well. This allows the 81 mm Mortar Platoon Commander to join and operate his unit from their position rather than from within the FSCC and hence reduces the requirement for his assistant. Additionally, the headquarters Messenger/Driver was eliminated simply due to the fact that the Mortar Platoon has (and still retains) significant communication assets (10 radio operators and 5 wiremen) and other motor vehicular assets with

which he can maintain proper liaison. The remaining change within Structure "C" within the headquarters was using an Ammunition Technician (Corporal, 2311) rather than an Ammunition NCO. The Mortar Platoon retains an Ammunition NCO within each 81 mm section.

81 mm Section Structure

Within the 81 mm mortar sections of the Mortar Platoon, the only changes have been the reduction of Ammunition Men (Private, 0341) by two per squad. This allows retention of a Section size of 0-18 personnel including three communicators (Mortar Team, Mortar Support Section). Although not ideal, this size section was determined to be adequate during this study's Field Evaluation at CLNC. Further, the 81 mm mortar Squad, as constituted herein, consists of five personnel, which is exactly the type and size used in FM 23-90 (81 mm Mortar) (Chapter 2, para. 53, pg 49, and Figure 23, pg 50). This leaves, within each 81 mm section, a total of 8 personnel dedicated to each section headquarters (includes 3 communicators).

LWCMS Section Structure

The LWCMS Sections of the Mortar Platoon are configured identically to those within the rifle companies. In addition, each section, also, has a 3-man communications mortar team from the Mortar Support Section of the Comm Platoon. This now allows proper communications monitoring and integration into the FDC and FSCC, and additionally allows for independent employment of either section (just as with an 81 mm section) if desired. These sections

do not have to be implaced in proximity to the FDC, FSCC or the 81 mm mortar in order to be employed.

Fire Direction Control

Fire Direction Control has been suggested as a potential difficulty in this Mortar Platoon. This study group does not concur. As has been established, proper communications (radio and wire) have been retained at all levels. Secondly, the traditional 81 mm mortar platoon (M, X or I) of four sections has not had a dedicated FDC on any previous T/O. Normally, the FDC consisted of the Platoon Sergeant/ Operations Chief and three assistants (two to operate M16 plotting boards and one to maintain computer sheets) plus one communicator. The assistants have been individuals selected by the Platoon Commander and have come from within his own unit (that is, out of his own assets). It is envisioned that this will continue to occur. Additionally, each 81 mm section is capable of running its own independent FDC, just as it always has been able to do. Finally, the 60 mm LWCMS section is also capable, just as it always has been, of its own FDC functioning (the Section Leader does now, and still can, conduct all necessary computing), and is linked to its platoon headquarters with the additional communications.

In order to ensure these fire direction considerations were valid, the syllabus of the Infantry Officers Course (TBS) was reviewed and found to be in concurrence on this point.

Forwarded Observers

The need for forward observers has also been indicated as a

potential problem. The study group does not concur. A forward observer has been maintained within each 81 mm mortar section. This provides two FO's to be attached to rifle companies forward. The need for forward observers for the LWCMS has not been established, despite its increased range. If this is so, then each rifle company will also require an FO for its own organic LWCMS Section. The study group feels as though the rifle company has sufficient experienced assets to plan, request, and adjust 60 mm fires, originating from either the company or battalion level. It is simply a matter of which communication channel will be used--the procedures are the same. A radio operator from the Mortar Party of the Comm Platoon, who would normally accompany the mortar section FO, can still be assigned to the rifle company as would heretofore be done.

Ammunition Resupply

Lastly, it has been noted that ammunition expenditure and resupply/distribution might be a problem with this type unit. The study group agrees; however, this problem was not created by the conception of Structure "C"'s Mortar Platoon. It has always been of concern and a weakness in all battalion level mortar organizations. They have traditionally been reliant upon non-organic assets or motor vehicular transportation to move sufficient rounds. Structure "C"'s Mortar Platoon clearly does not solve this problem. On balance, however, it does not create it either. Use of available, nearby manpower (the Special Infantry Troop, for instance, although this is not considered proper or judicious), motor vehicles (organic to the

mortar platoons and non-organic, as available) and vertical resupply (helo or aerial delivery) will continue to be the methods for resupply.

Summary

In summary, considering the basic essential of "Shoot, Move, and Communicate", this Mortar Platoon has:

- No reduction in communication capability (nor Fire Direction Control).
- Not debilitated the ability of the Mortar Platoon to move or to echelon itself.
- As was detailed within the report, significantly enhanced the firepower and lethality of the battalion level mortar platoon.

Alternative

Finally, this has been accomplished with 1 officer and 27 enlisted personnel less than what is required currently of a four section 81 mm mortar platoon. Using 1-52, the only other feasible alternative is a three-section, 6-tube 81 mm Mortar Platoon. This study group does not find this alternative to be remotely competitive in that: it breaks the 1:1 supporting unit to maneuver element ratio established consistently throughout Structure "C"; it decreases the battalion commander's flexibility regarding multiple target engagement, both in terms of section employment (4 vs 3) and in total numbers of tubes (10 vs 6); and it drastically decreases mortar firepower (less than even exists today).

Conclusion

That the Mortar Platoon as presented within study Structure "C" is superior in terms of lethality and combat power to feasible alternatives for a battalion of about 900 Marines.

ITEM: Anti-Armor Platoon, Combined Arms Company

DISCUSSION: The preponderance of respondents accepted the increased density of TOW within the ground community. However, concern was voiced in two central areas: maintenance and employment.

Maintenance

It has been pointed out by FMF respondents that the TOW section of 0-21 personnel lacks a TOW technician. As a result, the study group reviewed MCO P5320.5C, Personnel Requirements Criterial Manual (PRCM) for guidance as to apportionment of technicians. The information does not exist for Dragon and TOW launchers. Therefore, a more unscientific approach was adopted.

The current TOW Company (T/O 4235M) of the Tank Battalion provides the following personnel for TOW launcher maintenance:

1	SSgt	2875
2	Sgt	2375
5	Cpl	2875
3	LCpl	2875
11		

Based on this T/O of 11 maintenance personnel to maintain 72 TOW launchers within the company, it can be deduced that 8 TOW launchers should reasonably require 1.2 personnel for maintenance.

As a result, this study has included 2 TOW Technicians (Sergeant and Lance Corporal, 2875) in the TOW Section Headquarters of the "enhanced" infantry battalion structure (see pages X1-3 and X1-4). As to Structure "C" itself, only one of these technicians is incorporated at this time (Sergeant, MOS 2875), created by the deletion of the SIT Admin Clerk (0151). This still leaves the strength of Structure "C" at a total of 916.

Employment

One respondent indicated that TOW should be moved from the battalions, as proposed in Structure "C", and centralized at the Regimental level, with a subsequent increase in DRAGON density at the battalion level. This was precipitated by a desire to have centralized assets with which to mass.

The study group does not concur based on the following points:

(1) DRAGON density for the battalion as a whole has increased in Structure "C" to 33 teams (24 at battalion, 9 at company level) from a previous high of 32 in the "X" Series and from 24 now present.

(2) Moving TOW to Regiment and then increasing the battalion's DRAGON assets at the battalion level violates the parameters and charter of this study if a compensatory reduction in battalion strength is not affected. Implicit to the guidance of structuring the battalion to a strength of "...about 900" is the understanding that one of the reasons for considering this structure is to efficiently use the scarce manpower resources currently available to

the Marine Division. It would remain quite simple, otherwise, were these constraints not real. This study could have suggested all necessary personnel above the 900 level required for absolute effectiveness merely be shifted to the Regimental level. However, there then would have been no resultant manpower savings to the Division. Therefore, such options were not considered.

(3) The remaining issue, then, is should the 21-man TOW section remain at the battalion level, as proposed in Structure "C", or should it be moved to Regiment, with the battalion strength reduced by 21 to 895? (Note: Consolidating at Regiment would probably require a few extra personnel beyond 21 x 3 (battalions) in order to form a platoon headquarters. Within the Division, this would require a minimum of 67+ x 3 (= 201+) additional manpower spaces).

As was discussed within this report (pg. III-150 to 162 and VIII 40 to 42), the preponderant rationale for placement of the TOW section within the infantry battalion is simply "responsiveness." As indicated by the report, if task organization has not been properly affected before the battle within an infantry battalion's sector, there does not appear to be much likelihood of successfully maneuvering additional assets in time to that unit, whether those assets are resident at division or regiment. Without TOW present, the duration of battle once engaged could be measured in terms of 4-6 minutes and the probability of sufficient destruction of the enemy significantly less. Additionally, as had been discussed in the report, the actual engagement with current organic anti-armor

assets (DRAGON), is within a 1,000 meter range for only a 1-2 minute duration.

As indicated on pg. III-152 of this report, "organic systems must be sufficient to withstand and defeat a reasonable first effort attack, ensuring survivability of the infantry battalion during the time period in which more adequate non-organic support can be maneuvered or otherwise brought to bear."

(4) As to addressing centralization versus decentralization, these concepts are viewed as a matter of perspective. From the vantage of the rifle company commander, organic TOW to the battalion is centralized. To the Regimental Commander it is decentralized; although to him, TOW at Division is centralized. The issue then evolves to intended employment. The ability to mass antitank fires against a main attack is retained by and at the Division level. In fact, this capability is now enhanced in that the Division Commander now does not have to relinquish any of these assets to forward units and thereby dilute his ability to mass antitank fires. Rather, his forward most units can now sustain themselves against first attacks until he can better isolate the true location of the main thrust.

Finally, the Regimental Commander is not without assets. He does in fact possess capability within the infantry battalion of his regimental reserve, and further can, as necessary, be augmented from division.

The study group contends that retention of the Antitank Company at the Division level and organic placement of TOWs within the

infantry battalion best addresses the needs of the ground component in a modern battle characterized by swiftness, lethality, and successive attacks.

Alternatives

Removing TOW from the battalion to regiment and increasing DRAGON density at the battalion level does not comply with the spirit of this study charter and increases the overall manpower requirement.

Removing TOW to the regiment is feasible, provided the infantry battalion strength is reduced accordingly. However, the responsiveness of this crucial and decisive weapons system at that level is diminished, and hence, the survivability of the front line battalion jeopardized.

Conclusions

(1) That the TOW section as proposed in this study be incorporated organically into the infantry battalion.

(2) That a TOW technician (Sgt 2875) be included in the Structure"C" T/O, either as an add-on billet (new strength = 917) or as a substitute for the 0151 admin clerk in the SIT headquarters element.

ITEM: Special Infantry Troop (SIT)

DISCUSSION: Respondents were mixed as to the structuring of the Special Infantry Troop. A common concern among most dealt with the SIT Headquarters structure. Additionally, most respondents favored the creation of this fourth maneuver element; however, they would prefer that it be a full-sized rifle company.

To address these concerns some points must be re-emphasized. The study group, too, supports the creation of a full-sized fourth rifle company; this is indicated in the "enhanced" version of Structure "C" provided in this final report. However, as long as the infantry battalion strength must be maintained at or about 900, the study group contends that the utility of additional spaces required for the Weapons Platoon of a fourth rifle company (1-41) is better realized, at this time, in the creation of other units (such as TOW, heavy machineguns, etc.) which more greatly enhance the combat power of the battalion, and which are becoming increasingly necessary in view of the threat. Simply put, these 42 additional spaces have been allotted to the TOW Section (0-22) and the Heavy Machinegun Section (0-19). Structure "A" of this report is the type which results if the fourth company is created--that is, Structure "A" is nothing more than Structure "C" less the TOW and Heavy Machineguns. As has been illustrated, this type unit's firepower is considerably less than that of Structure "C".

It was anticipated by the study group that at some point in the future, during periods of conflict, manpower constraints currently affecting the uniformed services may no longer exist. The Special Infantry Troop was structured with a headquarters element, etc., in anticipation that this future easement could occur and the battalion, subsequently, could expand with a minimal degree of turmoil to a full-size rifle company by simply creating a 42-man Weapons Platoon for the SIT.

Additionally, it was realized that the historical reality of manning levels of infantry battalions has been consistently less than desirable. As this peacetime reality is not envisioned to appreciably change, it is interesting to note that a Structure "C" infantry battalion manned at 87.5% of T/O (802 personnel) could, if the commander so desired, be manned with a 100% T/O H&S Company, three 100% T/O Rifle Companies, and a Combined Arms Company with all platoons and sections at 100% T/O, except the SIT, which would not be manned. It must be stressed that this effect was not intentionally created by the study group, nor does the group necessarily advocate capitalizing upon it; it, rather, was a serendipitous finding once the structure was created, and is one means by which austere manning levels can be accommodated for the present, while still achieving unity for the purpose of proper training.

It was also this knowledge that prompted the study group to place the SIT unit commander within the Combined Arms Company Headquarters as that company's Executive Officer. If and when the

SIT would be fully formed and manned as a fourth, complete Rifle Company, this individual rightfully should be assigned full time as its commander in order to properly train it for its multiple roles.

Lastly, it must be re-emphasized that the role of the SIT must not be misconstrued. The very existence of this unit, in combat, allows the battalion commander the flexibility to fight with three maneuver elements forward, none of which have been diluted by the requirement for establishing a viable reserve. Beyond an exclusive reserve mission, the SIT, in combat, can provide the forces, and hence ease the strain of continued exposure to additional mission requirements of the forward rifle companies, for such activities as Combat Outpost Duty (surveillance), as a reconnaissance-in-force, as a screening/covering force, etc. It must be reminded that the SIT differs in no way from any reserve unit which is faced with multiple assignments--however, not all of these commitments necessarily occur simultaneously.

Alternatives

(1) Expand the SIT to a fourth rifle company by adding a Weapons Platoon to it. This is not feasible at this time, if a 900 man constraint remains and if the need for TOW and Heavy Machine-guns is not diminished. It is valid and encouraged by this study group if the manpower constraint evaporates--this is supported in the study group's "enhanced" Structure "C".

(2) Abolish the TOW and Heavy Machinegun sections and create a fourth full rifle company. This is feasible by merely adopting Structure "A"; however, the study group feels that the pressing need for TOW and Heavy Machineguns to be present now in order that the battalion can be properly trained, obviates this alternative.

Conclusion

Retain the Special Infantry Troop in its present place and form as indicated by Structure "C".

ITEM: Communications Platoon

DISCUSSION: Concerns from various FMF respondents were essentially threefold: lesser numbers of field radio operators (from 40 to 36), loss of wiremen from 19 to 13, and need for two radio technicians vice one as proposed in Structure "C".

Field Radio Operators

FMFLANT's response (Enclosure (1) paragraph 1.g.) describes the distribution of field radio operators (2531's) required to establish and maintain the battalion's radio nets. As proposed in Structure "C", the allocation of radio operators to the Mortar Support Section (10) and the TACP (12) is adequate according to this response. However, as further discussed, the operations in the battalion headquarters and those of the tactical net at company level would require 18 radio operators, whereas only 14 remain available. The study group acknowledges this as accurate; however, it is necessary to point out that each Rifle Company, the Combined Arms Company, and the Special Infantry Troop of Structure "C" are all provided with two messengers

in their headquarters elements as opposed to only one in the previous "X" Series and the current "I" Series. It is intended that at least one of these individuals in each unit provide the manpower support to augment the communications operations at company level. That is, one of these individuals actually is a radio operator, though not by MOS, trained by those 2531's within the Communications Platoon. This method of structuring is, as is known, not without precedent. It might be reasonably proposed that ~~then~~ these billets merely be redesignated as 2531's and restructured into the Communications Platoon. It is agreed that this is feasible and would then provide 19 radio operators for the 18 indicated as necessary. However, the study group felt that these billets in the company headquarters provided retention of additional capability such as scout-snipers, messengers, and drivers which could provide a more diverse utility. As envisioned, the company level messengers serve as the scout-snipers instructors for the company, and as messengers, driver, and radio operator in the combat environment. This may well not be ideal but is considered as an efficient use of scarce resources. As indicated by the "enhanced" Structure "C", wherein five additional radio operators (2531) are added to the Communications Platoon, but two messengers are maintained at the company level, the study group acknowledges that in this instance, indeed, more may be better.

Wireman

Reduction of 6 wiremen (from 19 to 13) was also considered as too severe. The study group does not concur with this opinion. As

discussed by FMFLANT, of the 13 wiremen 5 are required and dedicated by T/O to the Mortar Support Section, leaving 8. The requirements of the battalion wire team, as postulated by FMFLANT, require 10 personnel aside from the mortar wiremen (3 two-man teams, a three-man switchboard crew, and a wire chief). To maintain speed of switchboard installation, it is felt that two additional personnel (above 8) to field the third installation team can either be temporarily constituted from the switchboard team, or can be garnered from any of a variety of other units or sections. The technical skills demanded of this MOS simply lend it to be one in which others can be quickly trained and temporarily substituted. Once again, this may not be particularly palatable, but it is a consideration when attempting to balance other demanding and competing skills with a considered manpower ceiling.

Radio Repairmen/Technicians

The statements concerning radio techs (2861) and repairmen (2841) are germane. A review of the Communications Platoon in Structure "C" indicates that an error does exist. T/O MOS 2884 (Ground Radar Repairman) would be 1 vice 2 as listed. The additional space then created should have been allocated to T/O MOS 2861 (Sgt Radio Technician). This distribution should be sufficient to maintain adequate repair and technical expertise within the Communications Platoon.

Alternatives

(1) Redesignate 5 Company Messengers (MOS 0311) from the Combined Arms Company, rifle companies, and SIT as radio operators

(MOS 2531). This is feasible,but not recommended for reasons as set forth in the discussion.

(2) Increase the T/O (MOS 2531) to 41 vice 36. This would require a battalion strength of 921. The study concurs with the increase, but realistically must include this only in the "enhanced" version of Structure "C".

(3) Increase the T/O (MOS 2512, Wireman) from 8 to 10 in the Communications Platoon Wire Section. The study group does not concur that this is an essential requirement of the battalion at this time; however, under less austere manpower circumstances may well be considered reasonable.

(4) Redesignate one MOS 2884 (Ground Radar Repairman) to MOS 2861, Sergeant (Radio Technician). The study group concurs and this change has been incorporated into the final Structure "C".

Conclusions

(1) Retain the T/O 2531 billets at 36 as appear in Structure "C".

(2) Retain two company messengers for each rifle company, SIT, and Combined Arms Company.

(3) Redesignate one MOS 2884 (Ground Radar Repairman (Sergeant)) to MOS 2861 (Radio Technician (Sergeant)) in Structure "C". (This has been incorporated--see Section X.)

ITEM: Logistics/Maintenance/Supply/Mortar Transport Supportability

DISCUSSION: A number of questions concerning Service Platoon capabilities emanated from FMF respondents.

At the onset, it must be reiterated that in the process of "fitting" capabilities into a unit constrained by manpower, the essential approach must be not so much what may be desired as it is one of sufficiency. That is, can the structure sufficiently support its mission? Each and every subordinate unit within this battalion, combat, combat support, and combat service support has been trimmed to an extent, not with the intent to debilitate any particular capability, but rather to ensure that all capabilities remain extant and can sufficiently contribute to the unit's mission. It is recognized that the capacity of the battalion is strained at this planning level of about 900 including meeting garrison requirements. The workload of clerks and logistics personnel may well require increased time and effort just as the load of the mortarman and infantryman may have increased.

In the realm of service support, the diminishing personnel size of the battalion (from 1193 ("M") to 916 ("C")) does not necessarily imply that a concomitant reduction in line items or motor vehicles or weapons has occurred. Using this logic, one could then stipulate that the service support unit structures should not be reduced from those levels required of an 1193 man battalion. This admittedly is valid to a degree. The effect of this approach, however, is that most, if not all, the burden of strength reduction must then be borne by combat and combat support units. The study group contends that, particularly a unit of this type whose express purpose for existing is combat, cannot afford to singularly degrade those elements which form the

combat element. There does exist a point to which the "teeth to tail" ratio can be altered that will ensure superior supportability and maintainability of the unit, but that unit will be incapable of destroying the enemy.

Armorers

A review of MCO P5320.5C (Personnel Requirements Criteria Manual (PRCM)) indicates that a battalion possessing the weapons density of Structure "C" would require three armament repair personnel to maintain all those weapons except DRAGON and TOW. (A TOW technician addition has been discussed elsewhere in this chapter). These three armorers, all MOS 2111, are distributed by grade as a Corporal, Lance Corporal, and Private. Structure "C" proposes a 3-man Armorer Section; however, grade distribution is a Sergeant, Corporal, and Lance Corporal. Coupled with a TOW technician, this section should sufficiently be able to support organizational level weapons and maintenance. This capability, it is noted, is essentially the same as originally existed with the "M" Series T/O. Figure VII-6, page VII-15, of this report indicates that the density of a weapons and types is basically the same in Structue "C" as was extant in the "M" Series T/O; both structures maintain three 2111's.

Transportation Section

In this instance, the PRCM is not definitive as to the required allocation of motor transport maintenance personnel for an FMF unit. Two approaches then were considered as the basis of assignment of 5 Auto Mechanics (3521). The PRCM (Chapter 23) does contain criteria

for allocation and distribution of motor vehicle maintenance personnel for non-FMF units. The algorithm used to derive these allocations is based on "maintenance equivalents" and numbers of vehicles. A maintenance equivalent for M151 jeeps does not exist; however, using the 0.75 equivalent assigned for 3/4-ton pickups, 3/4-ton vans, and sedans and station wagons (which assumes 15,000 miles of usage per year), the infantry battalions assets of 70 motorized, wheeled vehicles (for Structure "C") would produce a work unit of 52.5 (0.75 x 70). Staffing table 23-5 and 23-6 then allocates the following:

1	MT Maintenance Chief	GYSGT	3529
1	Auto Mech	SGT	3521
1	Auto Mech	CPL	3521
1	Auto Mech	LCPL	3521
1	Auto Mech	PVT	3521

plus an auto body repairman and fuel/electrical systems repairman. This algorithm does not require a Motor Transport Officer for this load. Structure "C" meets and exceeds this requirement as follows:

1	MT Maintenance Chief	GYSGT	3529
1	Auto Mech	SGT	3521
1	Auto Mech	CPL	3521
2	Auto Mech	LCPL	3521
1	Auto Mech	PVT	3521

An additional approach is to merely view "maintenance frequency" of the battalion's motor transport assets. Simply put, with 70 vehicles and 5 mechanics, each mechanic services 14 vehicles.

In garrison (5-day work week (minimum)) each vehicle is serviced by a mechanic every three weeks for 8 hours (minimum). In a 7-day work environment, each vehicle is serviced for 8 hours every 2 weeks.

The study group acknowledges that training demands, manning levels, etc., may not permit this degree of maintenance frequency. However, this potential capability does exist and is possibly even likely in a combat environment. The study group contends this to be reasonable.

Dining Facility Section

Chapter 4, PRCM, Food Service Criteria, table 4-1, establishes staffing levels for organizations serving various numbers of daily rations. The daily rations criteria is simply the amount of food fed to one Marine for one day (that is, a ration implies 3 meals per day per man). Hence, a battalion of 916 plus USN personnel would fall into the 951-1040 bracket of table 4-1. Simply, this work unit level would require 24 food service type personnel for the battalion. However, this implies that every man within the unit eats all meals every day in the dining facility. That is, it is the maximum workload which could occur under ideal conditions.

It is reasonable to presume that this is unlikely to occur with frequency. Considering that, with an infantry battalion, certain individuals do not subsist in the facility at all times (e.g., officers or others living off base, units conducting field training, skipped meals, etc.) plus the fact that the unit is not necessarily manned at 100% T/O, it is not without base to conclude that the unit

workload of the dining facility is less than that which requires 24 personnel.

It is the foregoing considerations of a garrison nature that leads the study group to contend that a dining facility section of less than 24 personnel (this does not include "food service attendants, i.e., "messmen") is plausible.

Further, as this study has stated in resolving the multiplicious trade-off dilemmas that confront this project, the ultimate consideration often became the combat requirement versus the garrison requirement. It is acknowledged that opting for the combat requirement may well vex an otherwise totally efficient garrison structure. This, however, is necessary and proper under the constraints imposed.

Within the combat environment, the workload of the food services unit is diminished due to the tactical orientation and tempo of the combat and combat support elements of the battalion, their disperse locations, and consequent reliance upon field rations. It is reasonable to conclude that not all units will subsist in a field mess at all times. It is just as reasonable to presume that the unit will seldom subsist all at the same time in the field mess (if this occurs for an extended duration, the battalion has been placed in a rearward area wherein additional non-organic dining facilites or field messes are available).

Structure"C" has proposed a 16-man dining facility section. The PRCM would stipulate that this size unit could provide subsistence for 680 personnel (at 3 meals per day). This (680) represents an

ability to feed 70% of a completely T/O battalion (USMC + USN = 984) at any time. Considering the realistic garrison manning levels that have been historically extant within the infantry battalion, field operations, personal subsistence habits, etc., and the realistic combat situations which preclude full utilization of a field mess, the study group contends that this 16-man dining facility section is sufficient under the current ceilings. However, the study group defers to the rationale which supports a 3-section food services section as provided in POM-82 and has incorporated this size unit into the "enhanced" version of Structure "C".

Supply Section

Reductions in the number of supply personnel is admittedly an area of concern. This section, as with others which have been discussed at length, is affected by the imposition of a manpower ceiling. In this regards, the "enhanced" version of Structure "C" includes four additional supply-type personnel in its T/O, including a fiscal clerk.

For the present, such changes as the consolidation of infantry battalion Purpose Code "C" Operating Stocks at the Regimental level, the automation of stock record cards administration onto a Mechanized Allowance List (MAL), etc., assists in reducing some workload of this section. It should be pointed out that, just as with such other service activities as motor vehicle maintenance, messing and armament repair, the efficiency and effectiveness of this (supply) section under an austere (8) manning level is directly determined by whether or not its personnel are of the proper MOS.

The study group firmly supports the opinions of those officers polled earlier in this study effort who contend that proper T/O manning by MOS (and grade if possible), particularly of service support units, is critical to effectiveness and readiness of the battalion. This position has been firmly indicated by Recommendation 3 of the report (Final Draft for Review).

Conclusion

That the Service Platoon as proposed by Structure "C" be implemented.

IX. COST BENEFITS ANALYSIS

A final consideration which requires comparative analysis in structure formulation is the alternate cost incurred by adoption of that structure and the resulting benefits that are derived with its implementation. A properly configured structure should produce pronounced benefits (or as a minimum, relative equivalency) for any additional costs above what is currently extant or what has been historically the norm. In this regard, the study group derived comparative cost factors for the preferred structure (Structure "C"), the "I" Series T/O (current FMF infantry battalion structure), and the "M" Series T/O (historical infantry battalion configuration).

As a complete entity, these infantry battalions were compared in four manners:

- 10-year Life-Cycle Cost (LCC),
- 10-year LCC versus Personnel Differential,
- 10-year LCC versus Maneuver-Potential Differential, and
- 10-year LCC versus Weighted Unit Value (WUV).

Cost Derivation

The dollar amounts displayed herein have been converted into FY 81 dollars. These amounts have also been adjusted upward to factor inflation at a mean rate of 1.5 over the 10-year cycle. The study group considered that recent year economic indicators have substantiated the continuance of a spiralling inflationary trend at a rate which would

double costs per decade (i.e., at 10% per year as a reasonable factor rate). This would imply FY 90 dollar costs would be double those of FY 81 and the mean effect across the 10-year cycle would be 150% (or a rate of 1.5). These figures are, in actuality, a bit higher than would be projected by the Cost Factors Manual; however, the study group determined that a more liberal (i.e., "higher") cost estimate was a preferable methodology and more reasonably representative of recent economic trends.

Additionally, a 10 year "discount factor" (from the Cost Factors Manual) was included in all computations. Incorporation of this additional "penalty" in the derived costs is considered prudent in that by so doing, consideration has been properly given to the fact that investment of dollars into the infantry battalion precludes opportunity for "investment" of these same dollars in some other type unit or weapons system from which "benefit" may also be derived for the Marine Corps as a whole.

The net effect of this approach to cost derivation is that those costs hereafter discussed should be considered as properly factored for future economic realities. Although this approach may tend to skew cost estimates to the high side, the study group contends that in so doing, true value comparisons can be made more accurately and budgetary programming projections can be formulated from a real-world base.

Comparative Cost Analysis

Figure IX-1 provides comparative cost data (one battalion 10-year Life-Cycle Cost) computed from MOC P7000.14A (Cost Factors Manual) and

and MCO P8011.4F (Marine Corps Table of Allowances for Class V(W) Materiel (Peacetime)) and adjusted upward (for inflation and discounting) as discussed previously.

COST FACTOR	M SERIES T/O (HISTORICAL)	I SERIES T/O (BASELINE)	STRUCTURE C	Δ
Personnel	159,184,544	120,917,582	125,281,095	-33,903,449 + 4,363,513
Equipment Acquisition	N/A	N/A	481,354	+ 481,354
Maintenance (1st-4th Echelon)	901,532	901,532	937,748	+ 36,216
Maintenance (5th Echelon)	812,547	812,547	952,087	+ 139,540
Training Ammo	8,689,370	8,689,370	10,660,518	+ 1,971,148
Total Cost	169,587,993	131,321,031	138,312,802	-31,275,191 + 6,991,771

Figure IX-1. Infantry Battalion 10-Year Life-Cycle Cost(s)

A note of explanation preceding discussion and comparative analyses of these figures is required. Equipment acquisition costs for "M" and "I" do not occur as the T/E major items of equipment of these structures has essentially remained unchanged during their transitions (excepting rifles and pistols) and pending final resolution of the infantry battalion structure. Replacement costs of like items of equipment whose life cycle has expired neither is incorporated as these would be constant for either T/O. For these reasons, maintenance and training ammunition costs for either the "M" or "I" T/O are equivalent. Structure "C" costs are true

value total costs and the Δ column represents the increase or decrease in 10-year life-cycle costs from "M" and "I" to Structure "C". Figure IX-2 describes more fully acquisition costs.

ITEM	QUANTITY	UNIT COST	TOTAL COST
M203	36	$ 227	$ 8,172
M2, 50 Cal	8	7,037	56,296
LWCMS	3	7,625	21,795
DRAGON	1	11,351	11,351
TOW	8	33,142	265,136
M151A2 Jeep	13	8,966	116,558
M416 Trailer	6	341	2,046
Total			$481,354

Figure IX-2. Acquisition Costs

Total Cost Comparison

The initial cost comparison that must be considered in cost analysis is "total cost". In this instance, total cost equates to the respective infantry battalion structure's 10-year Life Cycle Cost (LCC), inflated and discounted as previously discussed.

Figure IX-3 depicts these values as derived from figure IX-1 for three infantry battalion structures:

"M" Series T/O (Historical)

"I" Series T/O (Current)

Structure "C" (Proposed)

STRUCTURE (T/O)	10-YR LCC (DOLLARS)	Δ $ ABOVE BASELINE	% Δ $ ABOVE BASELINE
"I" (Baseline)	131,321,031	—	—
"M" Series T/O	169,587,993	+38,266,962	+29.1%
Structure "C"	138,312,802	+ 6,991,771	+ 5.3%

Figure IX-3. Total (10-Year Life Cycle) Costs

Graphically, Figure IX-4 displays the relative total cost differentials. As is evident, the "M" Series T/O was relatively more expensive than either the "I" Series T/O or Structure "C". By way of comparison, and as an explanatory note, this (Figure IX-4) also portrays the contribution to total cost of personnel costs. In all instances, these personnel costs are in excess of 90% of the total 10-year Life-Cycle Cost of the battalion. As a result, the "M" Series T/O personnel costs alone are significantly more than the total costs of either other battalion structure, simply due to its T/O strength of 1,193 versus 889 ("I") or 916 ("C").

This significant cost-driving factor could be viewed in simple economic terms as a supply curve. Figure IX-5 demonstrates this personnel strength - cost interaction as a (cardinal) total-utility function, wherein as the personnel strength "supply" increases, so

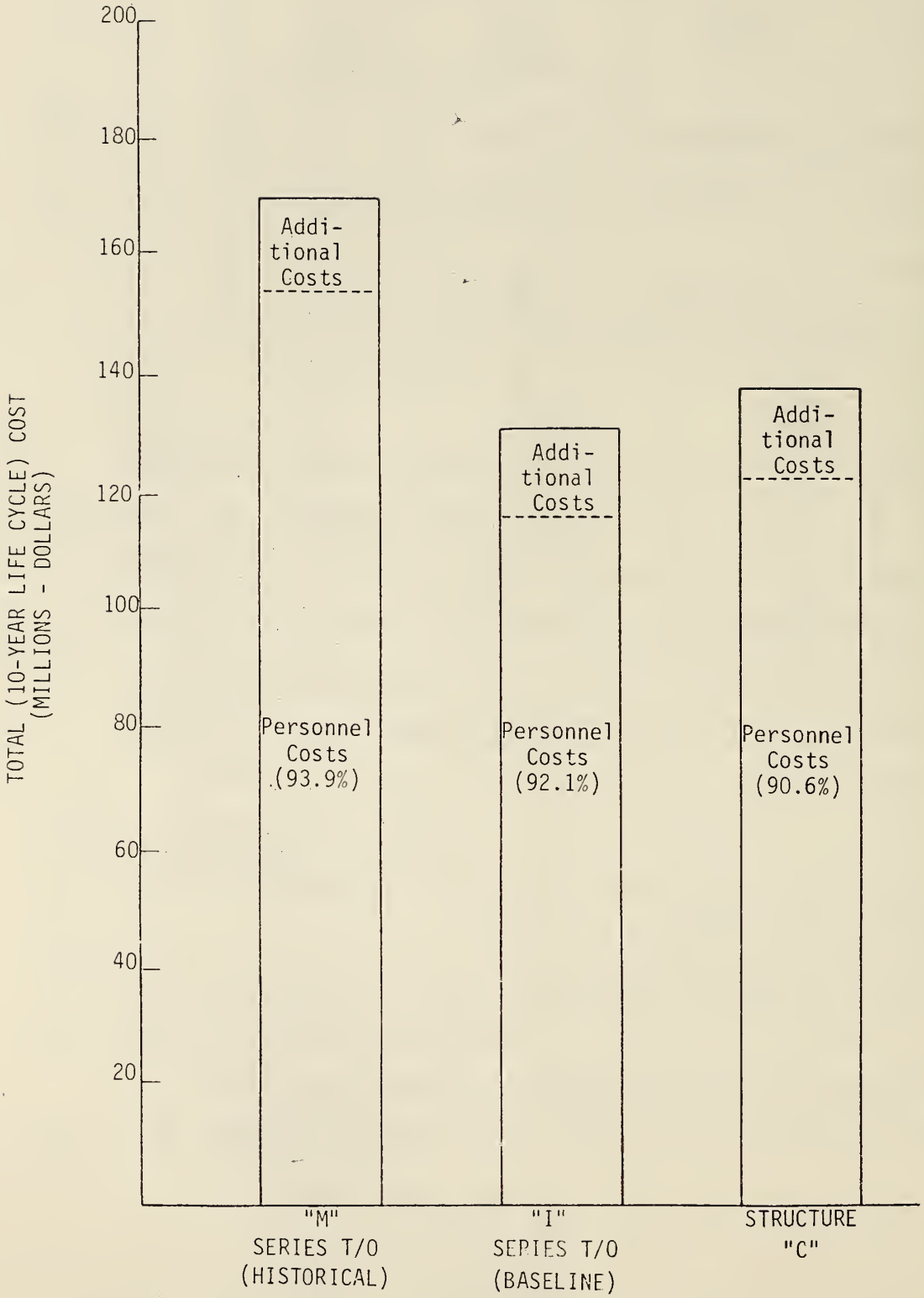


Figure IX-4. Infantry Battalion Comparative 10-Year LCC

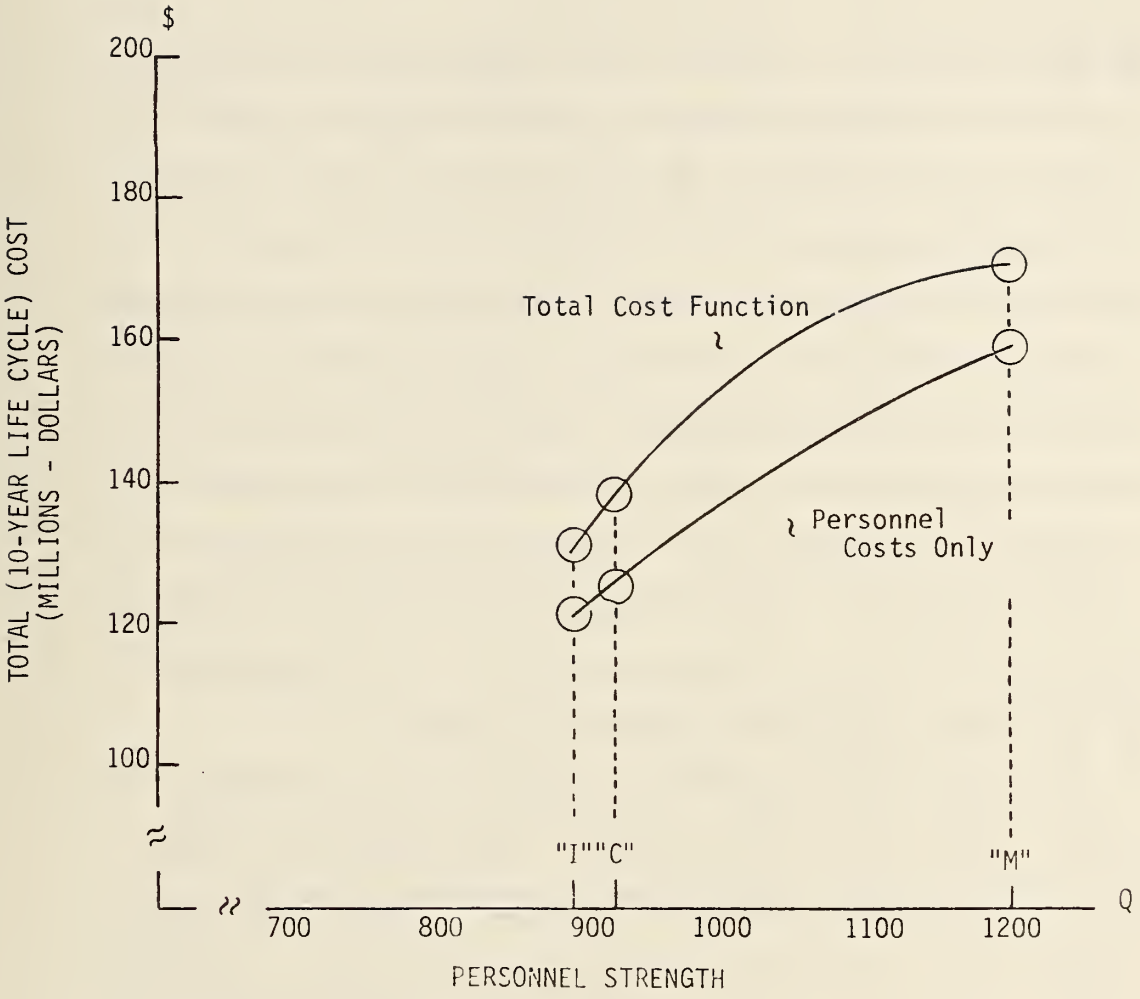


Figure IX-5. Infantry Battalion Cost Analysis (Cardinal) Total-Utility Function

too does the "cost" of that unit rise. Examination of the slope of a curve fitted to the three data points of the total-cost function indicates that it is "concave" with respect to Q (=personnel strength), thus suggesting that possibly the "marginal cost" (utility) of Structure "C" (and/or the "M" Series T/O) is high and hence, requires justification. Due to the significance of personnel costs to the total cost of an infantry battalion, Figure IX-5 also depicts the slope of a "personnel-only" costs curve developed from the three data points for personnel costs. The fact that this curve is virtually linear suggests that the increased personnel costs associated with Structure "C" are not the causative factors which account for its total cost being higher than might be expected.

Intuitively, this appears to be correct, simply by reviewing the first figure (IX-1) in this chapter. The increased costs above the "I" Series T/O associated with Structure "C" total approximately 7 million dollars, of which 4.3 million are attributable to increased personnel strength and 2.7 million to costs associated with weapons system acquisition, maintenance, and training ammunition. An analysis of "marginal-cost" utility comparisons should validate the suggestion that it is additional weapons systems (and their associated costs) which account for a higher total cost infantry battalion, and not personnel.

Figure IX-6 is a graphic portrayal of the marginal-cost utility of each structure. As is rather dramatically evident, the marginal cost of Structure "C" is extraordinarily high - virtually twice that of the "I" Series T/O marginal cost. However, the marginal "personnel-only" cost curve shows that purely in terms of personnel cost and personnel strength, Structure "C" is only slightly less efficient (i.e., more costly) than is the "I" Series T/O. From this finding, two observations can be made: (1) that the marginal "utility" of 27 additional personnel for Structure "C" in terms of their additional cost is essentially equivalent to the marginal-cost utility of the 889 personnel which comprise the "I" Series T/O, and, (2) that the quite large marginal total cost utility of Structure "C" is attributable almost exclusively to additional weapons systems and their associated costs.

As a result of these findings and observations, it can be stated that further cost analysis must be conducted of Structure "C" in order to ascertain if the additional costs of this structure are justifiable in terms of some complementary benefit beyond just additional personnel strength.

Complementary-Benefit - Cost Analysis

This study has identified four quantifiable factors characteristic of the infantry battalion:

- Cost
- Personnel strength
- Maneuver
- Unit value (WUV = Firepower + Mobility + Survivability)

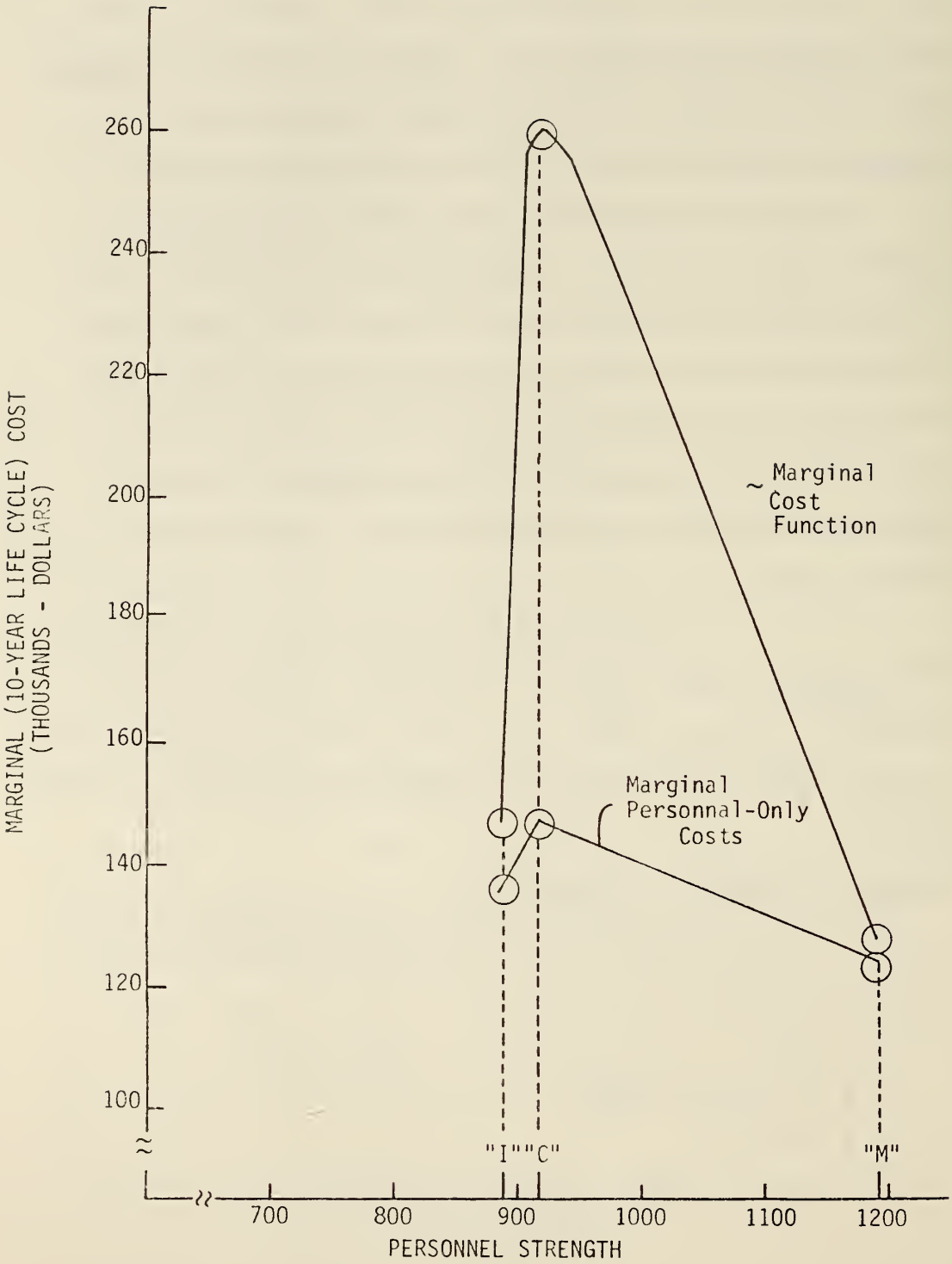


Figure IX-6. Infantry Battalion Cost Analysis
(Marginal-Utility Function)

The first two of these factors have been compared, analyzed, and discussed. Essentially, the additional costs associated with increased personnel strength are somewhat justifiable in and of themselves. However, Structure "C" also incurs extra costs above these. The study group contends that final justification of this structure must ultimately lie in whether these costs derive a considerable benefit in terms of the infantry battalion's ultimate mission - "...seek out and destroy the enemy by fire and maneuver..."

Cost-Maneuver Benefit Analysis

Figure VII-8 of Section VII of this study depicted maneuver as essentially a matter of choice (i.e., "perspective"). If one views maneuver as vested in the lowest tactical unit level (fire team), then the "I" Series T/O possessed a greater maneuver potential than did "Structure "C" with 81 fire teams versus 72." At any tactical unit level above fire team, Structure "C" possessed a greater potential. This potential, however, also costs more in total-dollar terms. The question then remaining to be answered is whether this increased maneuver potential is of greater value than the additional costs it requires.

In this analysis, comparison of total costs yields no pertinent data since the total cost of any one structure remains the same regardless of which maneuver unit level is considered. Referencing, figure IX-3, the "M" Series T/O costs $170 million dollars (10-year life cycle) for its 4 rifle companies and the same amount for its 36 rifle squads. Similarly, within the same level unit (e.g., platoon), comparison of cost versus number of units from structure to structure

does not yield comparable data because both cost and the number of units vary (i.e., is $170 million for 12 platoons ("M") better or worse than $131 million for 9 platoons ("I")?).

As a result, the most representative means of comparison in this instance is "Average Cost" per maneuver unit. Average Cost is simply the Total Cost of the structure divided by the number of maneuver units at any level. The analysis results from a comparison of like levels of maneuver units (i.e., fire team, squad, platoon, or company). This provides the amount of dollars required to provide one element of maneuver potential for that structure. The lesser the cost, the better; however, the more maneuver elements, also, the better. Ideally, then, the structure which possesses the greatest number of maneuver units (at a level) and which costs the least for each one of these, is preferred.

Figure IX-7 graphically compares the Average Cost per maneuver unit of each structure at all four maneuver-unit levels. Quite clearly, Structure "C" requires the least cost of any structure to provide one maneuver-unit potential at the squad, platoon, and company level. This finding is even more significant when coupled with the fact that at these same levels (squad, platoon, and company), Structure "C" also possesses a greater number of maneuver units than the "I" Series T/O. (See Figure IX-8.)

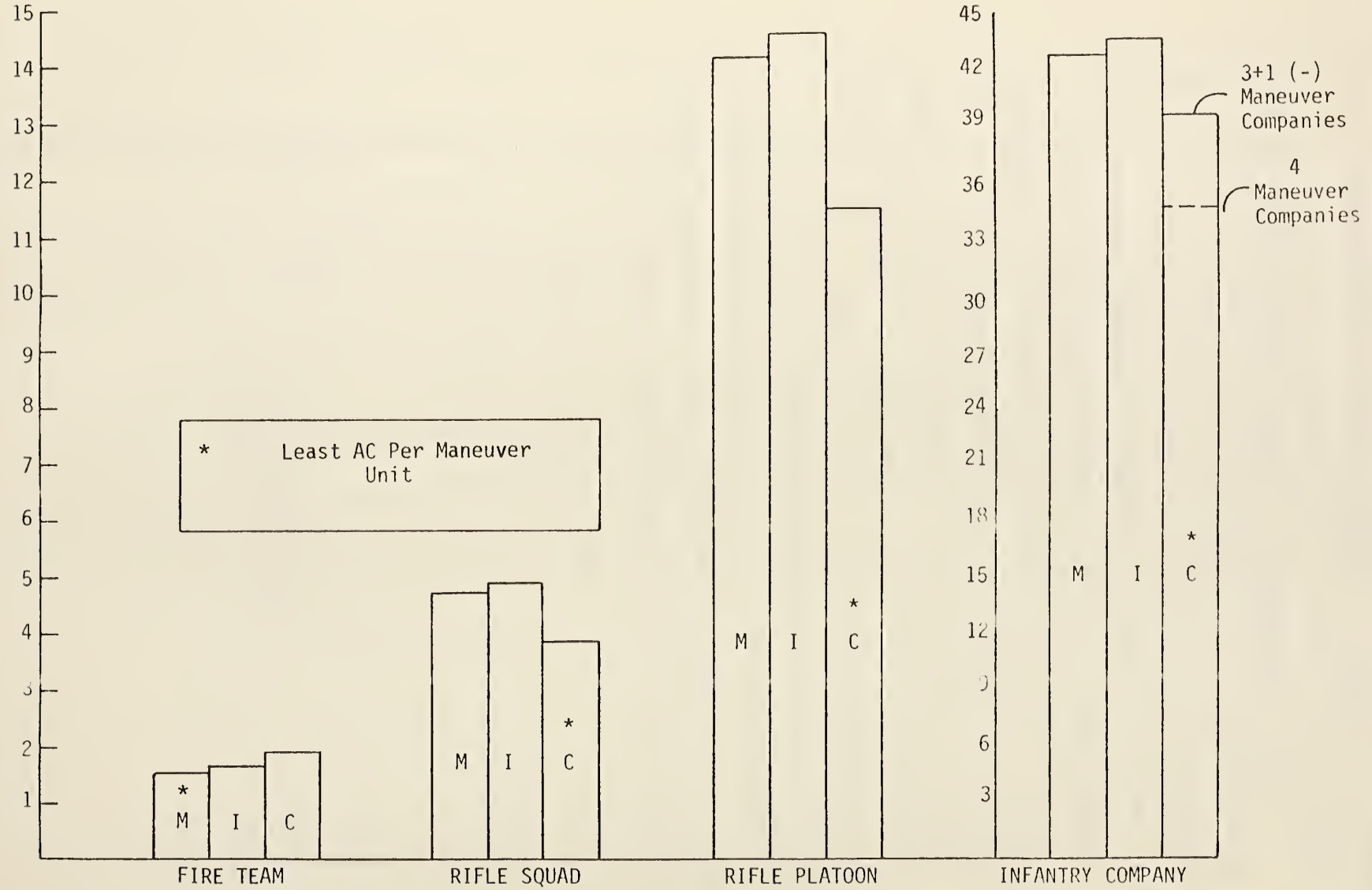


Figure IX-7. Type Maneuver Unit

	"M" (HISTORICAL)	"I" (BASELINE)	"C"
Fire Teams	108	81	72
Squads	36	27	36
Platoons	12	9	12
Companies	4	3	3 + 1 (-) = 4

Figure IX-8. Strength Matrix

A final measure to ascertain benefit-gained or lost is "marginal cost" per maneuver unit. That is, how much additional cost is required for each additional maneuver-unit above that which currently exists (i.e., "I" Series T/O). Figure IX-9 graphically portrays these values.

Simply put, these marginal costs indicate that Structure "C" requires significantly the least amount of additional dollars per each additional maneuver unit above what is currently extant ("I" Series T/O). Lest this rather startling graphic be discounted, it is simple to comprehend if one takes the rifle platoon level as an example. The "I" Series T/O requires $131 million to provide 9 of these platoons. For an additional $7 million, Structure "C" provides 12 platoons. That is, a 5.3% increase in cost yields a 33% increase in this type maneuver unit. Similarly, Structure "C" requires $32 million less than the "M" Series T/O, yet produces the same number (12) maneuver platoons.

As a result of the foregoing analyses, the study group contends that the additional cost required of Structure "C" (above "I") is justifiable in terms of the significant, complementary maneuver potential benefit derived.

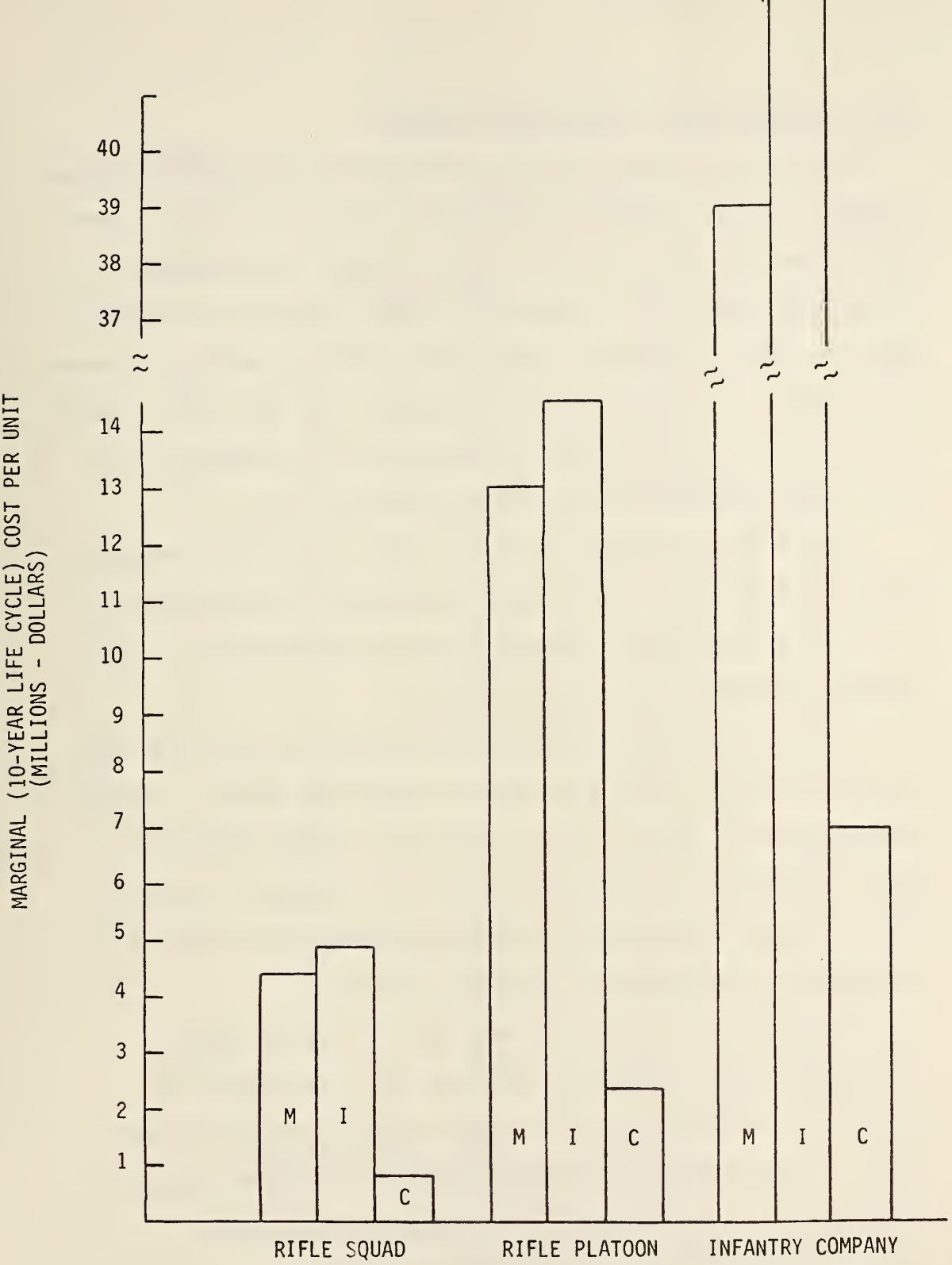


Figure IX-9. Infantry Battalion Cost Analysis
(Marginal-Cost Utility Function)

Cost - Firepower (Unit Value) Benefit Analysis

This study has addressed the use of the Weapons Effectiveness Index/ Weighted Unit Value (WEI/WUV) methodology to compare structures in terms of firepower, mobility, and survivability. Comparison of these unit values to structure costs is the final, critical determinant of benefit gained (or lost) by structure change. This analysis provides the measure (among others) of weapons system contribution to the unit cost. Ideally, of course, it is preferred that a structure have the highest possible unit value (hereafter, WUV) for the least amount of cost.

As with the cost-maneuver analysis, total cost and WUV comparisons do not yield pertinent data as costs are different for each structure as are the structure WUVs. Therefore, the average cost-utility and marginal cost-utility method must be used.

Figure IX-10 graphically portrays the relative structure average cost per WUV (i.e., how many dollars are required to support - "derive" - one WUV benefit). As is evident, Structure "C" requires the least amount of dollars per WUV benefit and, as well, the cost of any additional WUV benefit above what is currently available ("I" Series T/O) is substantially the least of the three structures.

In view of the fact that not only does the cost per WUV of Structure "C" require fewest dollars, but, also, that the WUV of Structure "C" is also higher than either other structure (+51% above "I") a substantial benefit in terms of increased firepower, mobility, and survivability has occurred. This benefit (+51% WUV above "I") serves to additionally justify the increased total cost (+5.3%) of Structure "C".

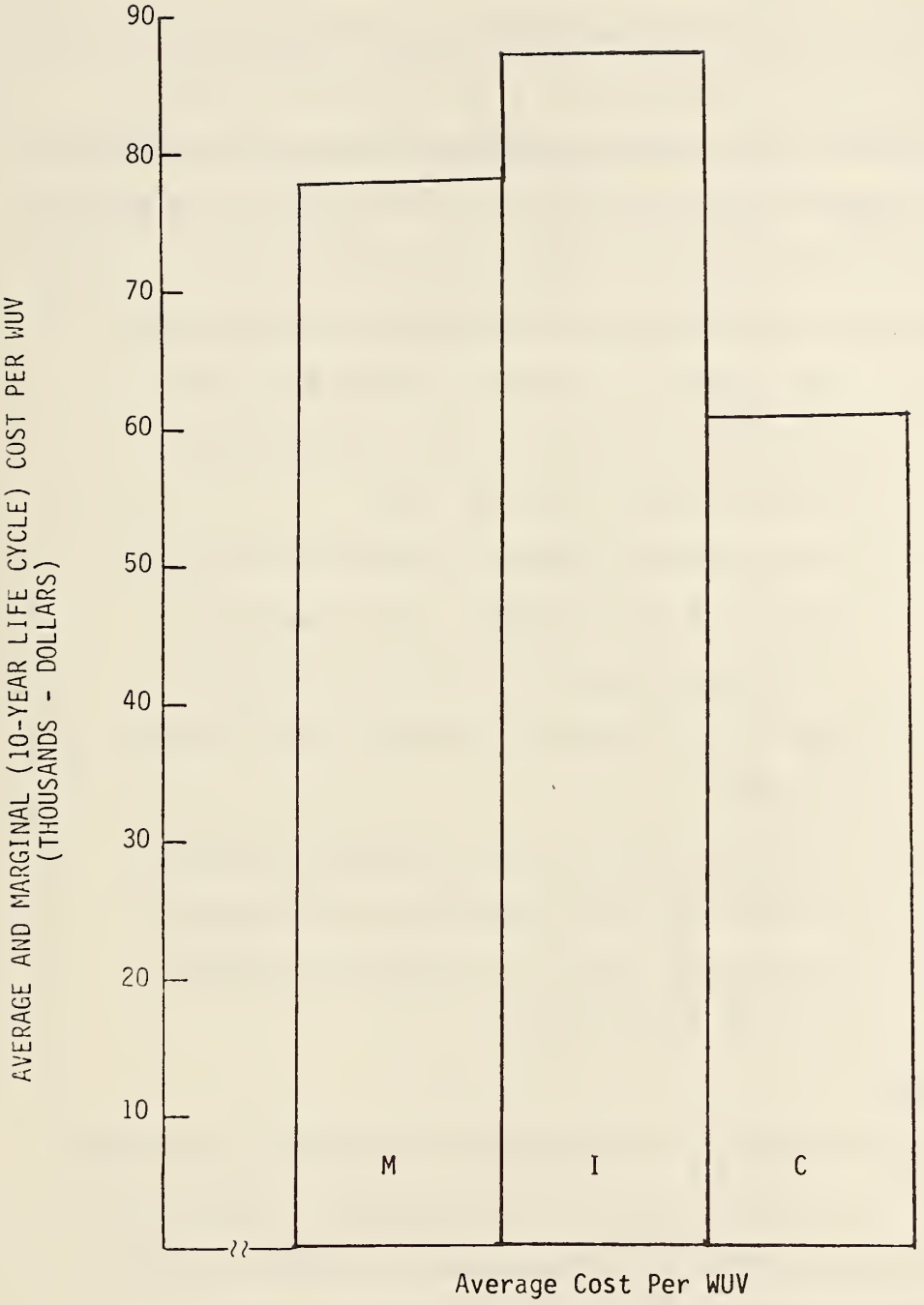


Figure IX-10. Infantry Battalion Cost Analysis (Marginal-Utility Function)

SUMMARY

Structure "C" requires approximately $7 million more (+5.3%) in total, 10-year Life-Cycle Cost than does the current "I" Series T/O, and $32 million less than the historic "M" Series T/O.

The benefits derived from this additional (5.3%) cost are:

- A 3% increase in personnel strength (+27) with a marginal-cost utility rate only slightly higher than that of the "I" Series T/O;
- A 33% increase in numbers of maneuver units available at each squad, platoon, and company level with a marginal-cost utility rate substantially lower (i.e., "cheaper") than that of the "I" Series T/O; and
- A 51% increase in unit value (firepower, mobility, survivability) with a marginal-cost utility rate significantly lower (i.e., "cheaper") than that of the "I" Series T/O.

CONCLUSIONS

That the additional 5.3% ($7 million) increase in 10-year life-cycle costs to obtain Structure "C" is undeniably justified in view of the personnel, maneuver, and unit value (firepower, mobility, and survivability) benefits derived from this structure.

X. RECOMMENDED INFANTRY BATTALION STRUCTURE

XA. Table of Organization and Manpower Recapitulation - Structure "C"

Following is a complete Table of Organization for the primary subelements (i.e., H&S Company, Combined Arms Company and Rifle Company) of Structure "C" along with a Table of Manpower Requirements - Recapitulation by MOS for each such unit. This T/O represents the final version of Structure "C" as suggested by the study group.

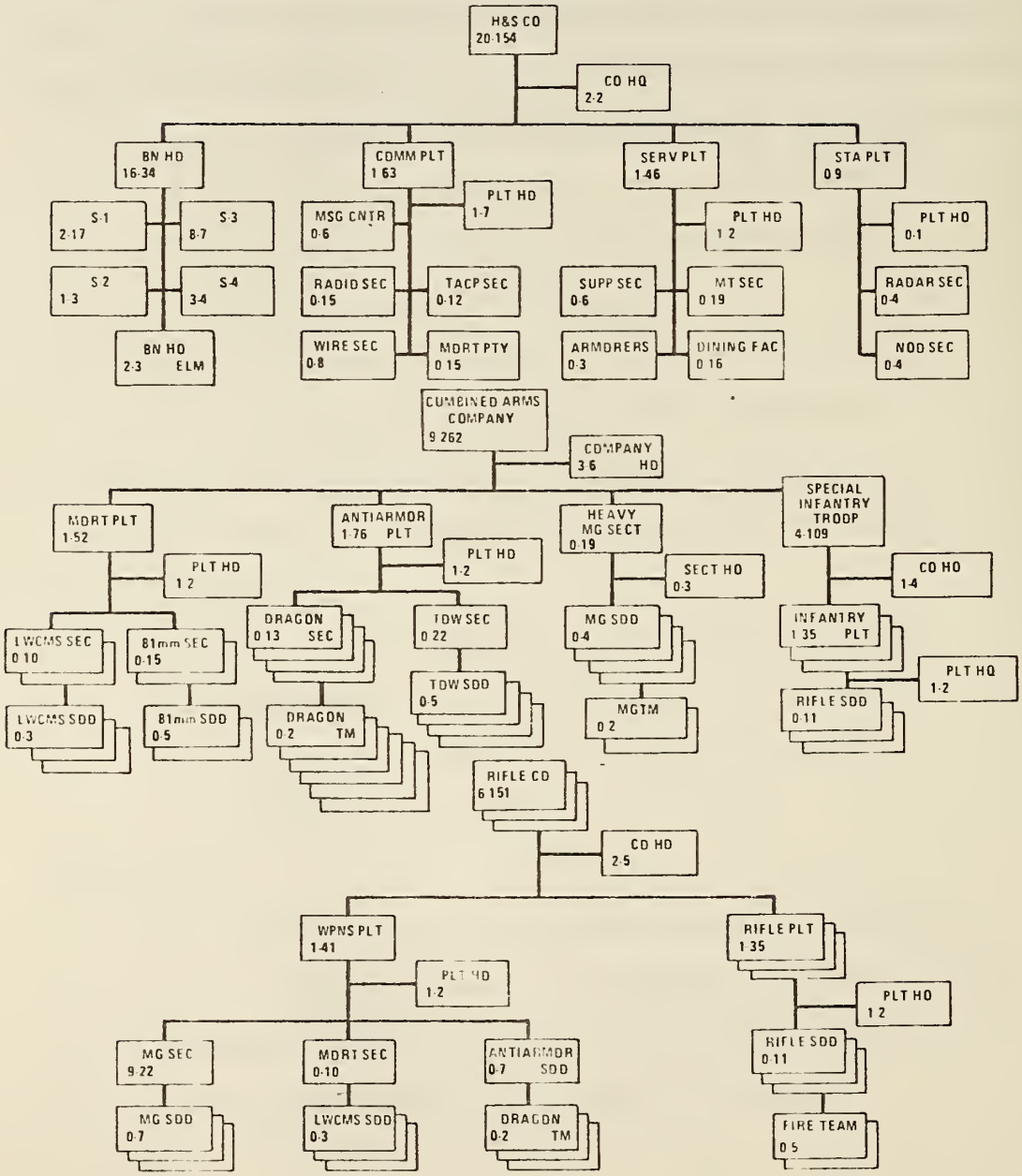


Figure X-I Structure "C"

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
1	*Battalion Headquarters																							
2	* Battalion Commander		LtCol	0302		M	O		1							P								
3	* Executive Officer		Major	0302		M	O		1							P								
4	* Sergeant Major		SgtMaj	9999		M	E			1						P								
5	* Messenger/Driver		Pvt	0311		M	E			2						M								
	Section Total Marine								2	3														
6	*S-1/Adjutant Section																							
7	* S-1/Adjutant		Lt	0302		M	O		1							P								
8	* Ass't S-1/Adjutant		Wo	0170		M	O		1							P								
9	* Pers Admin Chief		GySgt	0193		M	E			1						P								
10	* Pers Chief		SSgt	0193		M	E			1						P								
11	* Ass't Pers Chief		Sgt	0121		M	E			1						M								
12	* Pers Clerk		Cpl	0121		M	E			1						M								
13	* Pers Clerk		LCpl	0121		M	E			1						M								
14	* Pers Clerk		Pvt	0121		M	E			2						M								
15	* Unit Diary Clerk		Cpl	0131		M	E			2						M								
16	* Unit Diary Clerk		LCpl	0131		M	E			2						M								
17	* Unit Diary Clerk		Pvt	0131		M	E			1						M								
18	* Admin Clerk		Sgt	0131		M	E			1						M								
19	* Admin Clerk		Cpl	0151		M	E			1						M								
20	* Admin Clerk		Pvt	0151		M	E			1						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.		English Description	Bill Spon	Alpha Grade	MOS	F TN	B RN	T YP	S TA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W PN	Edu	S EP	S SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
21	*	Legal Services Man		Cpl	4421		M	E			1						M								
22	*	Legal Services Man		Pvt	4421		M	E			1						M								
		Section Total Marine								2	17														
23	*	S-2 Section																							
24	*	S-2		Capt	0202		M	O		1							P								
25	*	Intell Chief		GySgt	0231		M	E			1						P								
26	*	Intell Asst		Sgt	0231		M	E			1						M								
27	*	Intell Asst/Driver		Pvt	0311		M	E			1						M								
		Section Total Marine								1	3														
28	*	S-3 Section																							
29	*	S-3		Maj	0302	B	M	O		1							P								
30	*	Asst S-3		Capt	0302		M	O		1							P								
31	*	Liaison Officer		Lt	0302		M	O		2							P								
32	*	Asst S-3/Air Officer		Capt	7207		M	N		1							P								
33	*	Asst S-3/FAC		Lt	7207		M	N		2							P								
34	*	Infantry Opns Chief		MSgt	0369		M	E			1						P								
35	*	Infantry Opns Asst		SSgt	0369		M	E			1						P								
36	*	NBC Officer		Lt	9910	Z	M	O		1							P								
37	*	NBC Specialist		Sgt	5711		M	E			1						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
38 *	NBC Specialist		Cpl	5711		M	E			1						M								
39 *	Topographic Draftsman		LCpl	1431		M	E			1						M								
40 *	Admin Clerk		LCpl	0151		M	E			1						M								
41 *	Messenger/Driver		Pvt	0311		M	E			1						M								
		Section Total Marine							8	7														
42	*S-4 Section																							
43 *	S-4		Capt	0402		M	O		1							P								
44 *	Maint Management Off		Lt	0402		M	O		1							P								
45 *	Maint Management Chief		SSgt	0441		M	E			1						P								
46 *	Embarkation Officer		Lt	0430	Z	M	O		1							P								
47 *	Embarkation Asst		Sgt	0431		M	E			1						M								
48 *	Ammunition Tech		Cpl	2311		M	E			1						M								
49 *	Log Data Cont Clerk		LCpl	0441		M	E			1						M								
		Section Total Marine							3	4														
50	*Company Headquarters																							
51 *	Company Commander		Capt	0302		M	O		1							P								
52 *	Executive Officer		Lt	0302		M	O		1							P								
53 *	First Sergeant		1st Sgt	9999		M	E			1						P								
54 *	Gunnery Sergeant		GySgt	0369		M	E			1						P								
		Section Total Marine							2	2														

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
55	*Communications Platoon																							
56	* Platoon Headquarters																							
57	* Plt Cmdr/ Bn Comm Officer		Capt	2502	M	O			1							P								
58	* Communications Chief		MSgt	2591	M	E				1						P								
59	* Radio Tech		SSgt	2861	M	E				1						P								
60	* Radio Tech		Sgt	2861	M	E				1						M								
61	* GND Radar Rprman		Sgt	2884	M	E				1						M								
62	* Radio Rprman		Cpl	2841	M	E				1						M								
63	* Telephone-Teletype Tech		Cpl	2811	M	E				1						M								
64	* Teletype Tech		Cpl	2818	M	E				1						M								
65	*Message Center Section																							
66	* Message Center Section		SSgt	2549	M	E				1						P								
67	* Message Center Man		Cpl	2542	M	E				1						M								
68	* Message Center Man/Drvr		LCpl	2542	M	E				1						M								
69	* Message Center Man/Drvr		Pvt	2542	M	E				1						M								
70	* Teletype Operator		Cpl	2542	M	E				1						M								
71	* Teletype Operator/Drvr		Pvt	2542	M	E				1						M								
72	*Wire Section																							
73	* Wire Chief		Sgt	2512	M	E				1						M								
74	* Wire Supervisor		Cpl	2512	M	E				1						M								
75	* Wireman		LCpl	2512	M	E				2						M								
76	* Wireman		Pvt	2512	M	E				3						M								
77	* Wireman/Drvr		Pvt	2512	M	E				1						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
78	*Radio Section																							
79	* Radio Chief		SSgt	2537		M	E			1						P								
80	* Radio Supervisor		Sgt	2531		M	E			1						M								
81	* Field Radio Opr		Cpl	2531		M	E			3						P								
82	* Field Radio Opr		LCpl	2531		M	E			4						P								
83	* Field Radio Opr		Pvt	2531		M	E			5						P								
84	* Field Radio Opr/Drvr		Pvt	2531		M	E			1						M								
85	*Tact Air Cntl Pty Section																							
86	* Air Liaison Party																							
87	* Field Radio Opr		Cpl	2531		M	E			1						M								
88	* Field Radio Opr		LCpl	2531		M	E			1						P								
89	* Field Radio Opr		Pvt	2531		M	E			2						M								
90	*Fwd Air Cntl Pty/2 Each/								2 Each															
91	* Field Radio Opr		Cpl	2531		M	E			1						M								
92	* Field Radio Opr		Pvt	2531		M	E			2						P								
93	* Field Radio Opr		Pvt	2531		M	E			1						M								
94	*Mortar Support Section																							
95	* Mortar Liaison Party/1 Each/								1 Each															
96	* Field Radio Opr		Cpl	2531		M	E			1						P								
97	* Wireman		LCpl	2512		M	E			1						M								
98	* Field Radio Opr		Pvt	2531		M	E			1						P								
99	*Mortar Team/4 Each/								4 Each															
100	* Field Radio Opr		LCpl	2531		M	E			1						P								
101	* Field Radio Opr		Pvt	2531		M	E			1						P								
102	* Wireman		Pvt	2512		M	E			1						M								
	Section Total Marine								1	63														

T/O 1037C H&S Co Inf 8n Inf Regt

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SSC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
103	*Service Platoon																							
104	* Platoon Headquarters																							
105	* Plt Cmdr/Bn Sup Off		Lt	3002	M	O			1							P								
106	* Suoply Chief		SSgt	3043	M	E				1						P								
107	* Supply Admin Man		Sgt	3043	M	E				1						M								
108	*Supply Section																							
109	* Chief Warehouseman		Sgt	3051	M	E				1						M								
110	* Supply Admin Man		Cpl	3043	M	E				1						M								
111	* Gen Warehouseman		Cpl	3051	M	E				1						M								
112	* Supply Admin Man		LCpl	3043	M	E				1						M								
113	* Gen Warehouseman		LCpl	3051	M	E				1						M								
114	* Supply Admin Man		Pvt	3043	M	E				1						M								
115	*Armorer Section																							
116	* Inf Wpn Rprman		Sgt	2111	M	E				1						M								
117	* Inf Wpn Rprman		Cpl	2111	M	E				1						M								
118	* Inf Wpn Rprman		LCpl	2111	M	E				1						M								
119	*Transport Section																							
120	* Mt Section Chief		GySgt	3529	M	E				1						P								
121	* Auto Mech		Sgt	3521	M	E				1						M								
122	* Auto Mech		Cpl	3521	M	E				1						M								
123	* MV Operator		Cpl	3535	M	E				1						M								
124	* Auto Mech		LCpl	3521	M	E				2						M								
125	* MV Operator		LCpl	3535	M	E				4						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SSC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
126	* MV Operator		Pvt	3535		M	E			8						M								
127	* Auto Mech		Pvt	3521		M	E			1						M								
128	*Dining Facility Section																							
129	* Dining Facility Chief		GySgt	3381		M	E			1						P								
130	* Cook		SSgt	3371		M	E			1						P								
131	* Cook		Sgt	3371		M	E			2						M								
132	* Cook		Cpl	3371		M	E			2						M								
133	* Baker		Sgt	3311		M	E			1						M								
134	* Cook		LCpl	3371		M	E			5						M								
135	* Baker		LCpl	3311		M	E			1						M								
136	* Cook		Pvt	3371		M	E			3						M								
		Section Total Marine							1	46														
137	*Surv/Target Acq Platoon																							
138	* Platoon Headquarters																							
139	* Plt Sgt/Radar Sect Ldr		SSgt	0369		M	E			1						P								
140	* Radar Section																							
141	* Radar Teams/2 Each/									2 Each														
142	* Team Leader		Sgt	0311		M	E			1						M								
143	* Radar Operator		LCpl	0311		M	E			1						M								
144	* NOD Team/4 Each/									4 Each														
145	* NOD Operator		Cpl	0311		M	E			1						M								
		Section Total Marine								9														

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
146	*Chaplain Section																							
147	* Chaplain		Lt	4100	N	O					1					U								
	Section Total Marine																							
	Navy										1													
148	*Medical Platoon																							
149	* Bn Aid Sta 1st Echelon																							
150	* Bn Surgeon		Lt	2100	N	O					1					P								
151	* Medical Chief		Hmc	8404	N	E						1				P								
152	* Bn Corpsman		Hml	8404	N	E						1				P								
153	* Environ San Tech		Hml	8432	N	E						1				P								
154	* Admin/Supply Man		Hml	8404	N	E						1				P								
155	* Bn Corpsman		Hm2	8404	N	E						2				P								
156	* Bn Corpsman		Hm3	8404	N	E						3				P								
157	* Bn Corpsman		Hn	8404	N	E						2				P								
158	*Bn Aid Sta 2d Echelon																							
159	* Asst Bn Surgeon		Lt	2100	N	O					1					P								
160	* Asst Medical Chief		Hmc	8404	N	E						1				P								
161	* Bn Corpsman		Hml	8404	N	E						1				P								
162	* Admin/Supply Man		Hml	8404	N	E						1				P								
163	* Bn Corpsman		Hm2	8404	N	E						2				P								
164	* Bn Corpsman		Hm3	8404	N	E						4				P								
165	* Bn Corpsman		Hn	8404	N	E						1				P								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
166	*Company Med Teams/4 Each/										4	Each												
167	* Company Corpsman		Hm2	8404	N	E						1				P								
168	* Platoon Corpsman		Hm3	8404	N	E						4				P								
169	* Platoon Corpsman		Hn	8404	N	E						6				P								
		Section Total																						
		Navy									2	65												
		Organizational Totals																						
		Marine																						
		Chargeable																						
		Naval Aviator							3															
		Other							17	154														
		Total							20	154														
		Navy																						
		Chargeable									3	65												

Footnote Section

28 * B 01 - Additional Duty as As S-5

36 * Z 01 - Secondary MOS 5702 desirable

46 * Z 01 - Secondary MOS 3502 desirable

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	F T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P N	Edu	S E P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
Individual Weapons																								

Pistol	Revolver	Rifle	Ar	SMG	Unarmed	Revolver S.N.
132		109			1	

Ln No To Ln No	PEN	MCC
	_____	_____
	_____	_____
	_____	_____
	_____	_____

T/O 1037C H&S Co Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Naval Aviators																				
1	7207						1	2												3
	Total						1	2												3
Marine Officers																				
2	0170								1											1
3	0202						1													1
4	0302				1	2	2	4												9
5	0402						1	1												2
6	0430							1												1
7	2502						1													1
8	3002							1												1
9	9910							1												1
	Total				1	2	5	8	1											17
	Total				1	2	6	10	1											20
Marine Enlisted																				
10	0121					1	1	1	2											5
11	0131						2	2	1											5
12	0151					1	1	1	1											4
13	0193			1	1															2
14	0231			1		1														2
15	0311					2	4	2	4											12
16	0369		1	1	2															4
17	0431					1														1
18	0441				1			1												2
19	1431							1												1
20	2111					1	1	1												3
21	2311						1													1
22	2512					1	1	3	8											13

T/O 1037C H&S Co Inf Bn Inf Regt

T/O 1037C H&S Co Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
23	2531					1	7	9	19											36
24	2537				1															1
25	2542						2	1	2											5
26	2549				1															1
27	2591		1																	1
28	2811						1													1
29	2818						1													1
30	2841						1													1
31	2861				1	1														2
32	2884					1														1
33	3043				1	1	1	1	1											5
34	3051					1	1	1												3
35	3311					1		1												2
36	3371				1	2	2	5	3											13
37	3381			1																1
38	3521					1	1	2	1											5
39	3529			1																1
40	3535						1	4	8											13
41	4421						1		1											2
42	5711					1	1													2
43	9999	1	1																	2
	Total	1	3	5	9	18	31	36	51											154
Naval Officers																				
44	2100						2													2
45	4100						1													1
	Total						3													3

T/O 1037C H&S Co Inf Bn Inf Regt

T/O 1037C H&S Co Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Naval Enlisted																				
46	8404			2	4	8	23	27												64
47	8432				1															1
	Total			2	5	8	23	27												65

Grade Average Marine Officer 2.60
Grade Average Marine Enlisted 3.54
Grade Average Civilian

T/O 1037C H&S Co Inf Bn Inf Regt

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
1	*Company Headquarters																							
2	* Company Commander		Capt	0302		M	O		1							P								
3	* Executive Officer		Capt	0302	B	M	O		1							P								
4	* Company Operations Off		Lt	0302		M	O		1							P								
5	* First Sergeant		1stSgt	9999		M	E			1						P								
6	* Operations Chief		MSgt	0369		M	E			1						P								
7	* Supply Sergeant		Sgt	0311		M	E			1						M								
8	* Admin Clerk		LCpl	0151		M	E			1						M								
9	* Messenger/Driver		Pvt	0311		M	E			2						M								
		Section Total Marine							3	6														
10	*Mortar Platoon																							
11	* Platoon Headquarters																							
12	* Platoon Commander		Lt	0302		M	O		1							P								
13	* Plt Sgt/Opns Chief		GySgt	0848		M	E			1						P								
14	* Ammo Tech		Cpl	2311		M	E			1						M								
15	*81mm Mortar Section/2 Each/								2 Each															
16	* Section Leader		SSgt	0369		M	E			1						P								
17	* Ammo NCO		Cpl	0341		M	E			1						M								
18	* Ammo Man/Driver		LCpl	0341		M	E			2						M								
19	* Fwd Observer		Sgt	0341		M	E			1						M								
20	*81mm Mortar Squad/2 Each/								2 Each															
21	* Squad Leader		Cpl	0341		M	E			1						M								

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
22 *	Gunner		LCpl	0341		M	E			1						M								
23 *	Asst Gunner		LCpl	0341		M	E			1						M								
24 *	Ammo Man		Pvt	0341		M	E			1						M								
25 *	Ammo Man/Driver		Pvt	0341		M	E			1						M								
26	*LWCMS Section/2 Each/									2 Each														
27 *	Section Leader		Sgt	0341		M	E			1						M								
28 *	LWCMS Squad/3 Each/									3 Each														
29 *	Squad Leader/Gunner		Cpl	0341		M	E			1						M								
30 *	Ass't Gunner		LCpl	0341		M	E			1						M								
31 *	Ammo Man		Pvt	0341		M	E			1						M								
		Section Total Marine							1	52														
32	*Antiarmor Platoon																							
33 *	Platoon Headquarters																							
34 *	Platoon Commander		Lt	0302		M	O		1							P								
35 *	Platoon Sergeant		GySgt	0369		M	E			1						P								
36 *	Messenger/Driver		Pvt	0311		M	E			1						M								
		Section Total Marine							1	2														
37	*DRAGON Section/4 Each/									4 Each														
38 *	Section Leader		SSgt	0369		M	E			1						P								

T/O 1027C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
39	*DRAGON Team/6 Each/									6 Each														
40	* DRAGON Gunner		Cpl	0352	M	E				1						M								
41	* Asst Gunner		Pvt	0352	M	E				1						M								
42	*																							
	Section Total Marine									52														
43	*TOW Section																							
44	* Section Leader		SSgt	0369	M	E				1						P								
45	* TOW Technician		Sgt	2875	M	E				1						M								
46	* TOW Squad/4 Each/									4 Each														
47	* Squad Leader		Sgt	0352	M	E				1						M								
48	* Gunner		Cpl	0352	M	E				2						M								
49	* Asst Gunner/Driver		Pvt	0352	M	E				2						M								
	Section Total Marine									22														
50	*Heavy Machinegun Section																							
51	* Section Headquarters																							
52	* Section Leader		GySgt	0369	M	E				1						P								
53	* Messenger/Driver		LCpl	0331	M	E				1						M								
54	* Ammo Man/Driver		Pvt	0331	M	E				1						M								
55	* Heavy Machinegun Squad/4 Each/									4 Each														
56	* Squad Leader/Gunner		Cpl	0331	M	E				1						M								
57	* Gunner		LCpl	0331	M	E				1						M								
58	* Asst Gunner/Driver		Pvt	0331	M	E				2						M								
	Section Total Marine									19														

T/O 1027C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
59	*Special Infantry Troop																							
60	* Headquarters																							
61	***																							
62	* Executive Officer		Lt	0302		M	O		1							P								
63	* First Sergeant		1stSgt	9999		M	E			1						P								
64	* Gunnery Sergeant		GySgt	0369		M	E			1						P								
65	* Messenger/Scout		Pvt	0311	Z	M	E			2						M								
		Section Total Marine							1	4														
66	*Rifle Platoon/3 Each/								3	Each														
67	* Platoon Headquarters																							
68	* Platoon Commander		Lt	0302		M	O		1							P								
69	* Platoon Sergeant		SSgt	0369		M	E			1						P								
70	* Messenger		Pvt	0311		M	E			1						M								
71	* Rifle Squads/3 Each/								3	Each														
72	* Squad Leader		Sgt	0311		M	E			1						M								
73	* Fire Team/2 Each/								2	Each														
74	* Fire Team Leader		Cpl	0311		M	E			1						M								
75	* Automatic Rifleman		LCpl	0311		M	E			1						A								
76	* Grenadier Rifleman		LCpl	0311	Z	M	E			1						M								
77	* Assault Rifleman		Pvt	0311	Z	M	E			1						M								
78	* Rifleman		Pvt	0311		M	E			1						M								
		Section Total Marine							1	35														
		Organization Totals Marine Chargeable							9	262														

T/O 1027C Combined Arms Company Inf Bn Inf Regt

T/O 10277C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	F T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P N	Edu	S E P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
Footnote Section																								
3*B 01 - Additional duty as				as special infantry troop commander																				
69*Z 01 -				add du MOS 8541																				
76*Z 01 - Armed with M203																								
77*Z 01 - Armed with M203																								

Individual Weapons

Pistol	Revolver	Rifle	AR	SMG	Unarmed	Revolver S.N.
26		227	18			

LN NO TO LN NO	PEN	MCC
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

X-20

T/O 10270 Combined Arms Company Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Marine Officers																				
1	0302						2	7												9
	Total						2	7												9
Marine Enlisted																				
2	0151							1												1
3	0311					10	18	36	44											108
4	0331						4	5	9											18
5	0341					4	12	18	14											48
6	0352					4	32		32											68
7	0369		1	3	10															14
8	0843			1																1
9	2311						1													1
10	2875					1														1
11	9999		2																	2
	Total		3	4	10	19	67	60	99											262

Grade Average Marine Officer 2.22
Grade Average Marine Enlisted 3.26
Grade Average Civilian

T/O 10270 Combined Arms Company Inf Bn Inf Regt

T/O 1013C Rifle Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SSC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
1	*Company Headquarters																							
2	* Company Commander		Capt	0302		M	O		1							P								
3	* Executive Officer		Lt	0302		M	O		1							P								
4	* First Sergeant		1stSgt	9999		M	E			1						P								
5	* Gunnery Sergeant		GySgt	0369		M	E			1						P								
6	* Admin Clerk		LCpl	0151		M	E			1						M								
7	* Messenger/Scout		Pvt	0311	Z	M	E			2						M								
	Section Total Marine								2	5														
8	*Weapons Platoon																							
9	* Platoon Headquarters																							
10	* Platoon Commander		Lt	0302		M	O		1							P								
11	* Platoon Sergeant		GySgt	0369		M	E			1						P								
12	* Messenger		Pvt	0311		M	E			1						M								
13	*Machinegun Section																							
14	* Section Leader		SSgt	0369		M	E			1						P								
15	* Machinegun Squad/3 Each/									3 Each														
16	* Squad Leader		Sgt	0331		M	E			1						M								
17	* Machinegun Team/2 Each/									2 Each														
18	* Machinegun Team Leader		Cpl	0331		M	E			1						M								
19	* Gunner		LCpl	0331		M	E			1						P								
20	* Ammo Man		Pvt	0331		M	E			1						M								
21	*LWCMS Mortar Section																							
22	* Section Leader		Sgt	0341		M	E			1						M								
23	* LWCMS Mortar Squad/3 Each/									3 Each														

T/O 1013C Rifle Company Inf Bn Inf Regt

T/O 1013C Rifle Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
24 *	Squad Leader/Gunner		Cpl	0341		M	E			1						P								
25 *	Asst Gunner		LCpl	0341		M	E			1						P								
26 *	Ammo Man		Pvt	0341		M	E			1						M								
27 *	Antiarmor Squad																							
28 *	Squad Leader		Sgt	0352		M	E			1						M								
29 *	Antiarmor Team/3 Each/								3	Each														
30 *	Gunner		Cpl	0352		M	E			1						M								
31 *	Asst Gunner		Pvt	0352		M	E			1						M								
		Section Total																						
		Marine							1	41														
32 *	Rifle Platoon/3 Each/								3	Each														
33 *	Platoon Headquarters																							
34 *	Platoon Commander		Lt	0302		M	E		1							P								
35 *	Platoon Sergeant		SSgt	0369		M	E			1						P								
36 *	Messenger		Pvt	0311		M	E			1						M								
37 *	Rifle Squads/3 Each/								3	Each														
38 *	Squad Leader		Sgt	0311		M	E			1						M								
39 *	Fire Teams/2 Each/								2	Each														
40 *	Fire Team Leader		Cpl	0311		M	E			1						M								
41 *	Automatic Rifleman		LCpl	0311		M	E			1						A								
42 *	Grenadier Rifleman		LCpl	0311	Z	M	E			1						M								
43 *	Assault Rifleman		Pvt	0311	Z	M	E			1						M								
44 *	Rifleman		Pvt	0311		M	E			1						M								
		Section Total																						
		Marine							1	35														
		Organization Totals																						
		Marine																						
		Chargeable							6	151														

T/O 1013C Rifle Company Inf Bn Inf Regt

T/O 1013C Rifle Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	F T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Civ	W P N	Edu	S P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
Footnote Section																								
7 * Z 01				Add DU MOS 8541																				
43 * Z 01 - Armed with M203																								
44 * Z 01 - Armed with M203																								

Individual Weapons

Pistol	Revolver	Rifle	AR	SMG	Unarmed Revolver S.N.
25		114	18		

LN NO TO LN NO	PEN	MCC
	_____	_____
	_____	_____
	_____	_____
	_____	_____
	_____	_____

Table of Manpower Requirements
Recapitulation by MOS

1 Aug 1980

T/O 1013C Rifle Company Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Marine Officers																				
1	0302						1	5												6
	Total						1	5												6
Marine Enlisted																				
2	0151							1												1
3	0311					9	18	36	42											105
4	0331					3	6	6	6											21
5	0341					1	3	3	3											10
6	0352					1	3		3											7
7	0369			2	4															6
8	9999		1																	1
	Total		1	2	4	14	30	46	54											151

Grade Average Marine Officer 2.17
Grade Average Marine Enlisted 3.19
Grade Average Civilian

T/O 1013C Rifle Company Inf Bn Inf Regt

XB. IMPLEMENTATION PLAN

The vast array of material which has been presented in this study and the seemingly quite disperse characteristics of the infantry battalion structure as it currently exists ("I" series T/O) vis-a-vis that which the study group is proposing (structure "C") do not readily lend themselves to easy comprehension as to how these changes could be affected. Therefore, the study group has included, herein, a plan for implementation--a transition plan, as it were, from the "I" series T/O to structure "C".

Although the natural tendency in these matters is to expedite the occurrence, the study group is mindful that a more orderly, gradual transition will substantially lessen the turbulence and turmoil generally associated with organizational developmental change of depth. Additionally, sufficient lead time must be incorporated in this instance to properly initiate necessary budgetary programming to acquire the revised assets (men and materiel) associated with structure "C". Lastly, such a "time phased" implementation will also provide the opportunity to properly develop (or revise) and publish those doctrinal materials (FMs, operational handbooks, etc.) which should preface these changes.

The remainder of this chapter is presented as schematics and graphics showing "how" structure "C" is evolved. This implementation plan calls for three transitory phases:

Phase I - FY 81

Phase II - FY 82/83

Phase III - FY 84/85

Each phase incorporates those changes which can be affected according to current POM budgeting information and known developmental cycle information (LWCMS, etc.). An overview of each phase follows:

Phase I - those changes which can be affected within the next year and which require little or no additional resources.

Phase II - those changes which provide for all characteristic units of structure "C" that can be formed using a total USMC strength of 889; this phase does not require any additional personnel spaces, but does require delivery of the XM224 LWCMS to the battalions in order to initiate remaining "action" steps; for this reason, this phase is broadened to include FY 83 (as well as FY 82).

Phase III - those changes which will complete the total transition to structure "C"; this phase requires 27 additional personnel spaces for the battalion and acquisition of TOW equipment in order to be affected; hence, this phase has been scheduled last (FY 84/85) and with sufficient lead time to program, budget and acquire these resources.

The first set of seven schematics which follows embellishes this overview. Each phase is depicted with its primary action steps, their effects and results, followed by a total battalion wire diagram indicating the exact structure of the battalion (the first wire diagram is one of the startpoint - "I" series T/O).

The final section of this chapter is a detailed, sequential, action step-by-step plan covering all three phases of implementation. This detailed plan, presented by phases, lists the sequential action steps, the resources required to perform that step, the detailed methodology

and the effect of that step (methodology).

A final note is highlighted. Phase II is evidently the primary transitory phase, requiring the greatest number of steps. It should be borne in mind, however, that the study group is suggesting that this step not be undertaken until FY 82/83. This allows sufficient time to properly convey to all affected commands the precise transition and will, hence, substantially reduce turmoil while concomitantly building acceptance.

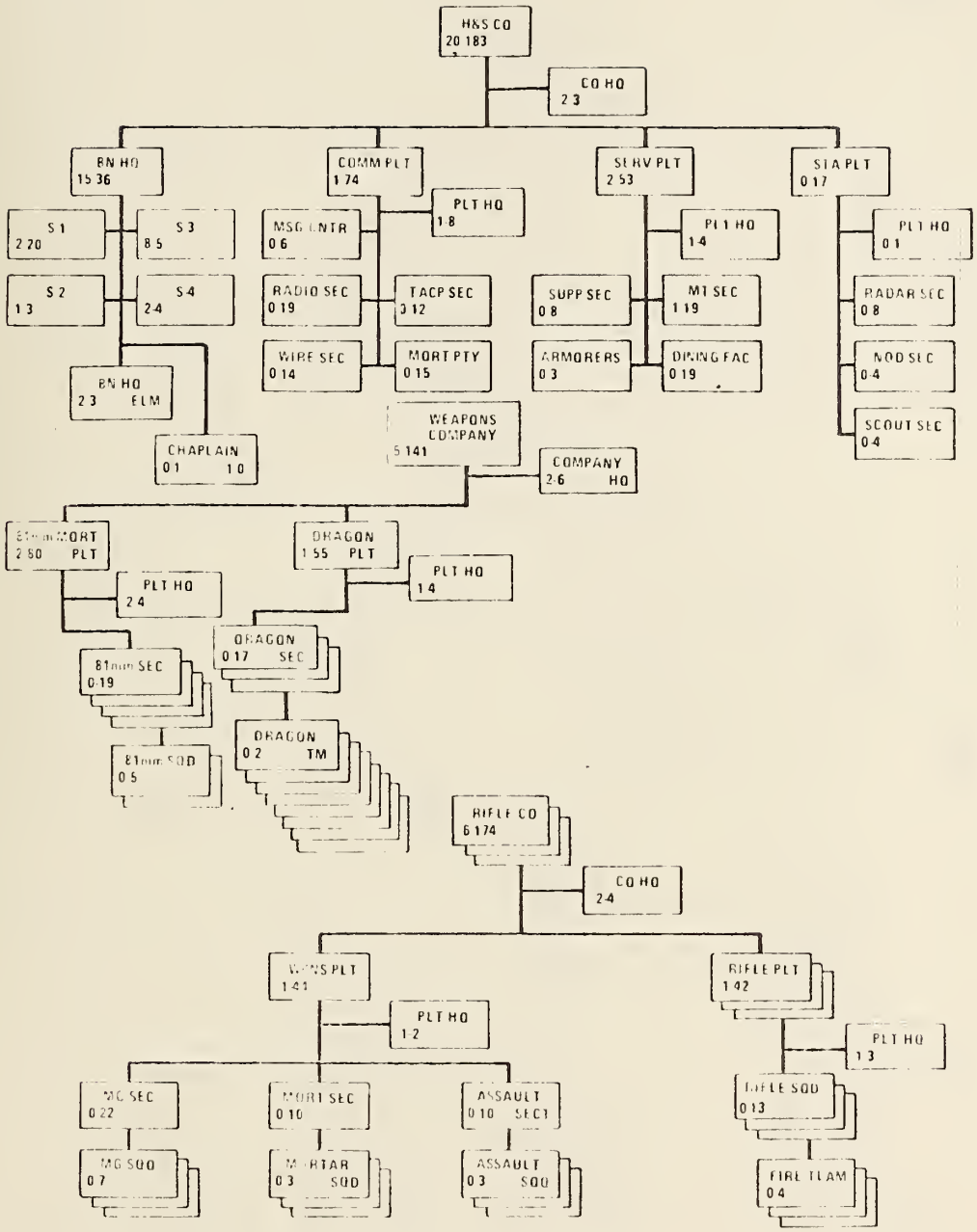
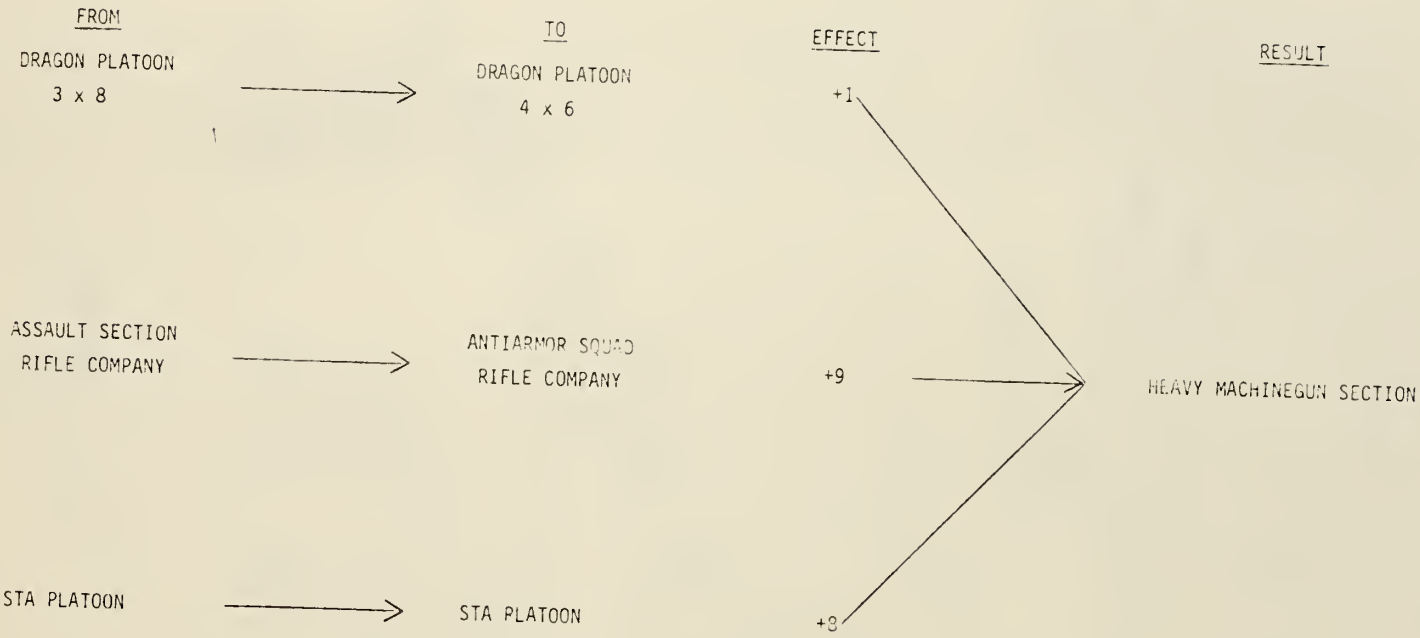


Figure X-2 "I" Series

FY-81


FROM
TO
EFFECT
RESULT
DRAGON PLATOON
3 x 8
DRAGON PLATOON
4 x 6
+1
ASSAULT SECTION
RIFLE COMPANY
ANTIARMOR SQUAD
RIFLE COMPANY
+9
HEAVY MACHINEGUN SECTION
STA PLATOON
STA PLATOON
+3

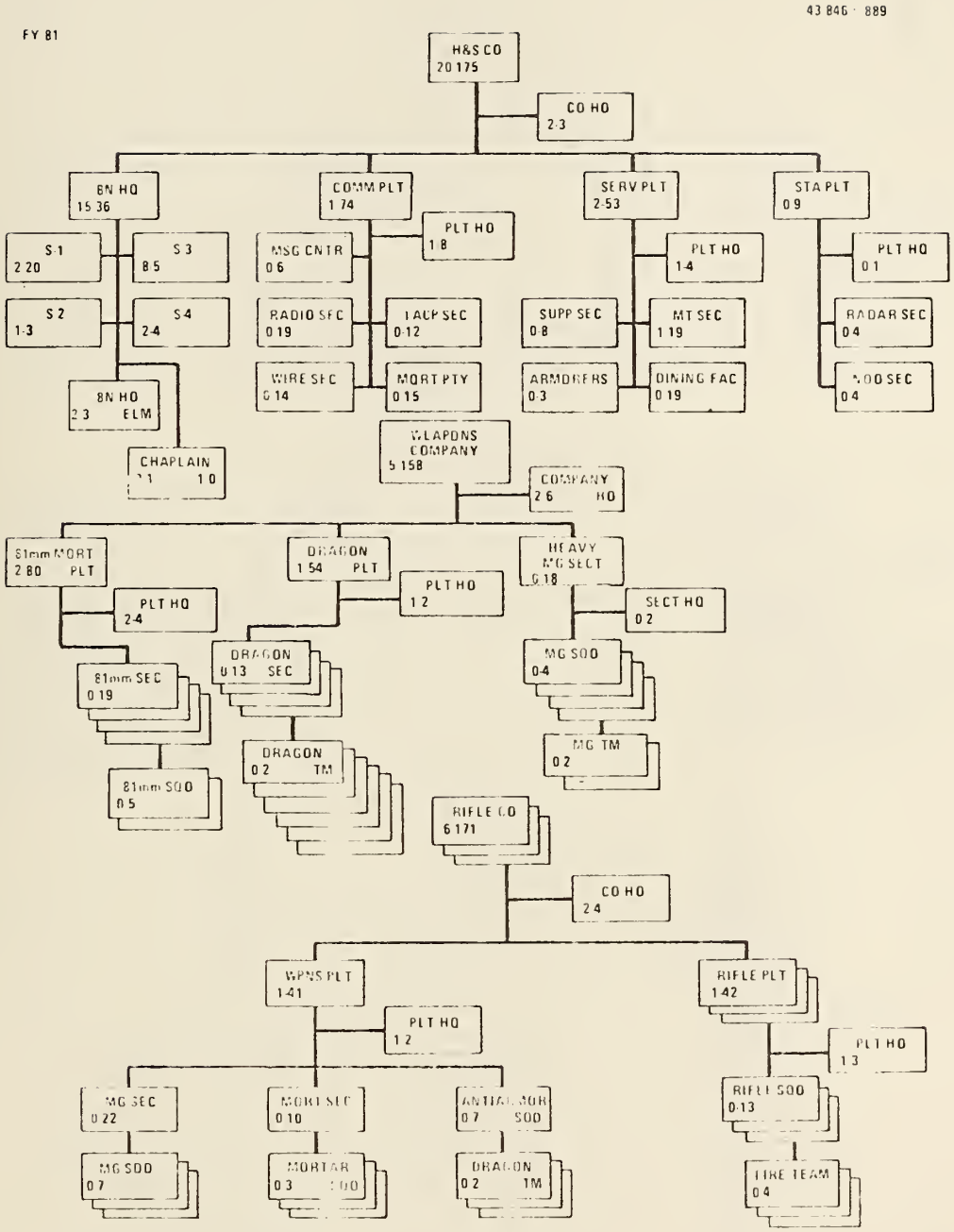
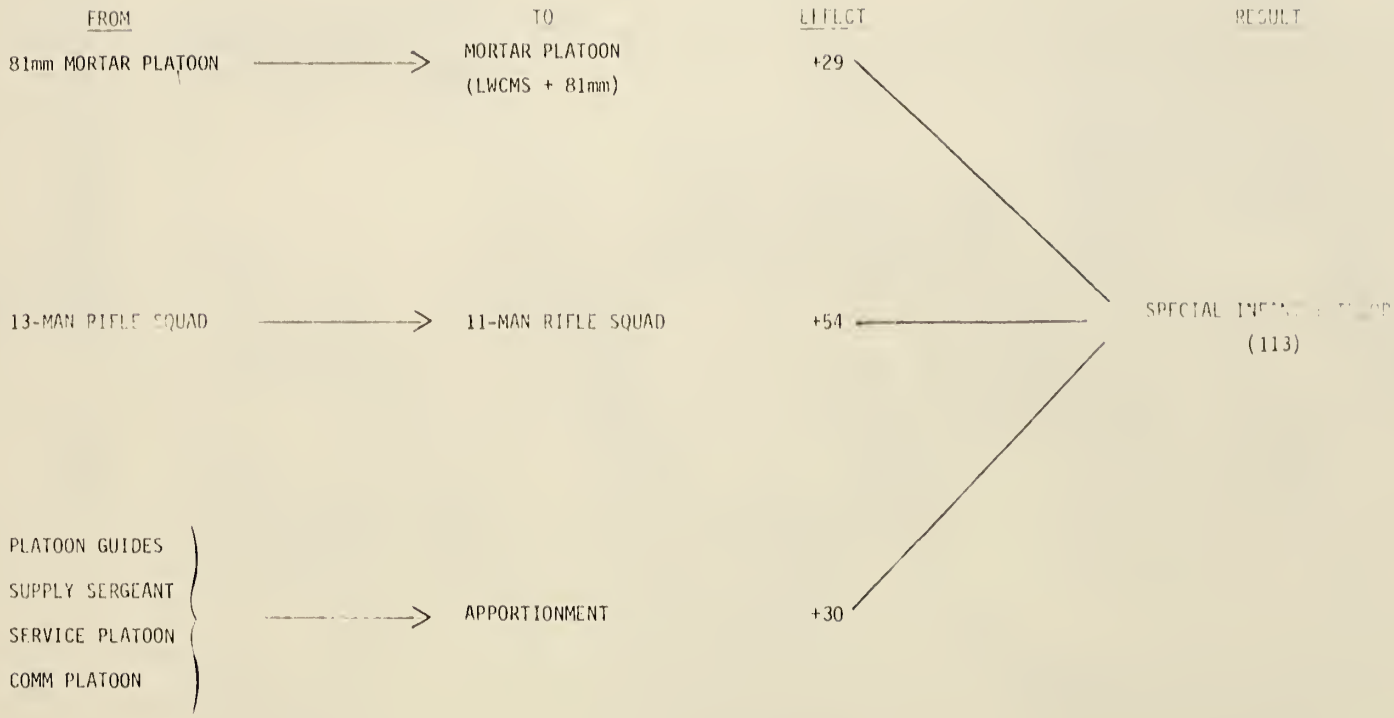


Figure X-3 FY-81 Battalion Structure

FY-82/83


FROM
TO
EFFECT
RESULT
81mm MORTAR PLATOON
MORTAR PLATOON
(LWCMS + 81mm)
+29
13-MAN RIFLE SQUAD
11-MAN RIFLE SQUAD
+54
(113)
PLATOON GUIDES
SUPPLY SERGEANT
SERVICE PLATOON
COMM PLATOON
APPORTIONMENT
+30

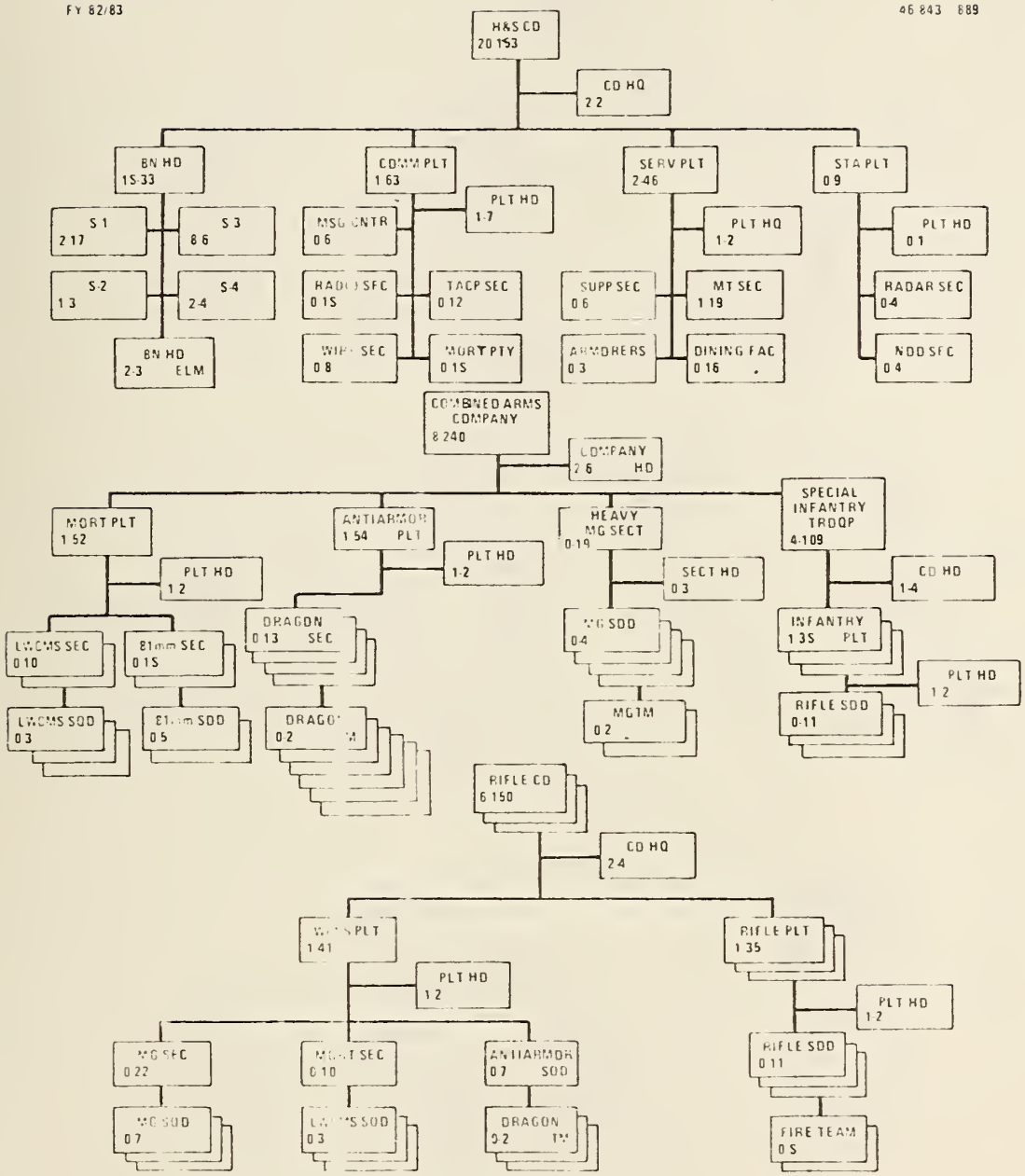


Figure X 4 FY-82/83 Battalion Structure

FY-84/85

FROM		TO	EFFECT	RESULT
889	⟶	AUTHORIZED 916	+27	TOW SECTION + ENHANCEMENTS

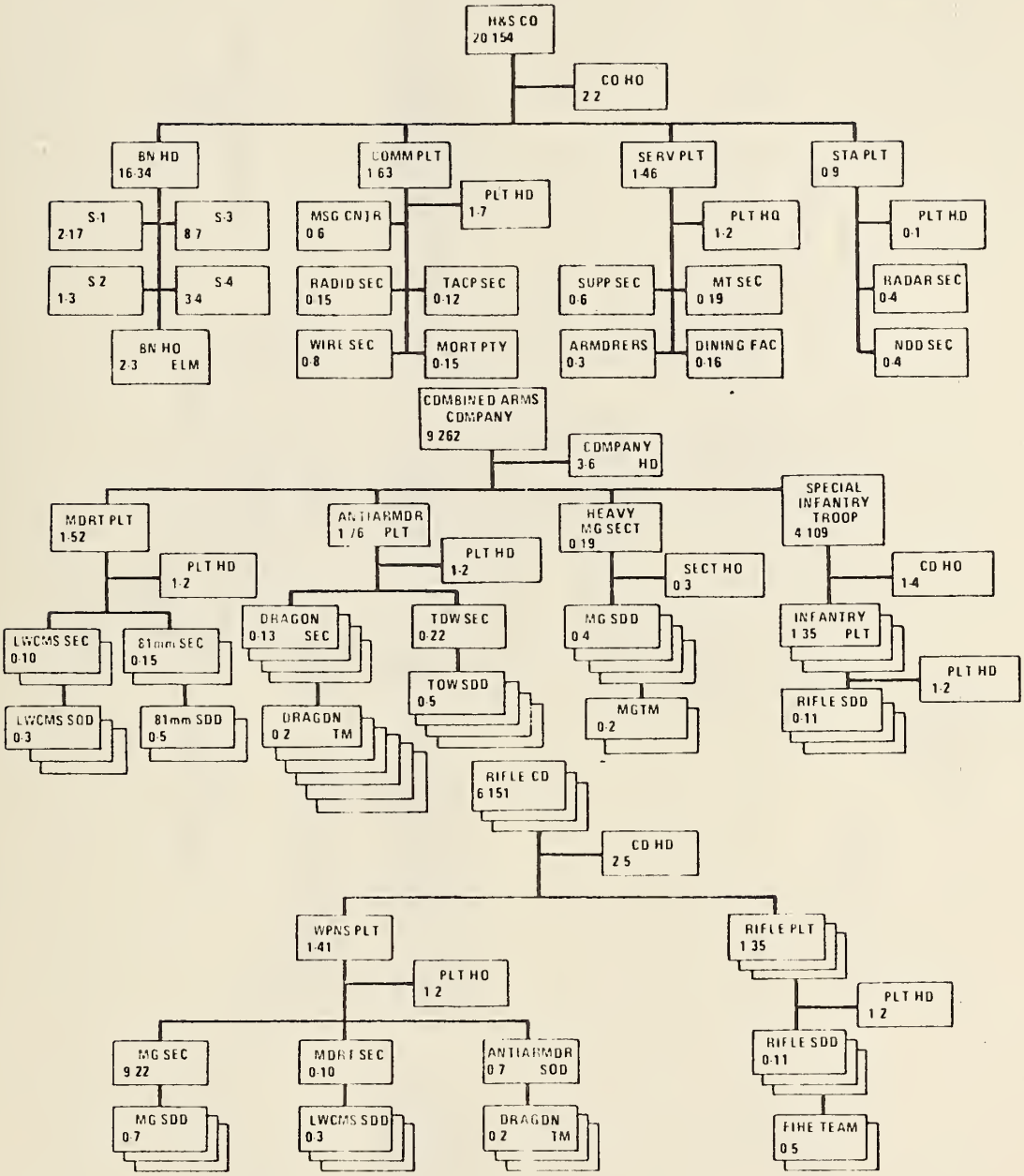


Figure X-5 FY-84/85 Battalion Structure

IMPLEMENTATION

FY-81

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
1. Reconfigure "I" series Dragon Missile Platoon from 3-8 team sections to 4-6 team sections	1. None	1. Delete two (2) LCpl 0311 Plt Messenger/Radio Opr (Line no. 43 - T/O 1027I) 2. Add one (1) SSgt (E-6) 0369 Antitank Assault Section Leader (Line no. 48 - T/O 1027I) 3. Change T/O to reflect Antitank Assault Section at 4 each (Line no. 45) 4. Change T/O to reflect Antitank Assault Teams at 6 each (Line no. 47)	1. 1 billet available 2. Decreases platoon strength by one from 1-55 to 1-54
2. Reconfigure "I" series Rifle Company, Weapons Platoon, Assault Section from a 10-man, 3-squad section to a 7-man, 3-team Antiarmor squad armed with Dragon	1. Original "X" series T/O required total of 32 Dragon teams for battalion. Step 1, above, plus step 2 here require 33 Dragon teams. Therefore, 1 additional Dragon team requiring 3 Dragon missiles plus one day tracker are required	1. Delete Assault Section, Weapons Platoon, Rifle Company (Lines 25-32, T/O 1027I) 2. Add Antiarmor Squad, Weapons Platoon, Rifle Company as follows: a. Squad Leader - Sgt (E-5) 0352 - total 1 b. Gunner - Cpl (E-4) 0352 - total 3 c. Asst Gunner - Pvt (E-1) 0352 - total 3	1. 3 billets per Rifle Company (= 9 per battalion) available

IMPLEMENTATION

FY-81

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
3. Reconfigure "I" series STA Platoon from 17 personnel to 9 personnel	1. None	1. Change number of radar sections from 4 to 2 (each) (Line no. 142 - T/O 10271) 2. Delete Scout Section (Line nos. 152-154 - T/O 10271)	1. 8 billets available
4. Add Heavy Machinegun Section (0-18) to "I" series Weapons Company T/O	1. Acquisition of 8 M2, .50 caliber machineguns and T/E components from current USMC assets	1. Using billets gained from T/O deletions in actions 1, 2, and 3, above, add Heavy Machinegun Section to "I" series T/O Weapons Company as follows: a. Section leader - GySgt (E-7) 0369 - total 1 b. Messenger/driver - LCpl (E-3) 0331 - total 1 c. Heavy Machinegun Squad 4 Each: (1) Squad leader/Gunner - Cpl (E-4) 0331 total 1 per squad (2) Gunner - LCpl (E-3) 0331 - total 1 per squad (3) Asst Gunner - Pvt (E-1) 0331 - total 2 per squad	1. Creates 0-18 man Heavy Machinegun Section using 18 billets created by above actions

IMPLEMENTATION

FY-82/83

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
1. Reconfigure "I" series Mortar Platoon from 4 2-tube, 81mm mortar sections to 2 2-tube 81mm mortar sections and 2 3-tube 60mm LWCMS mortar sections	1. Acquisition of 6 60mm LWCMS mortars (XM224) per battalion	1. From Platoon Headquarters, delete one (1) Lt 0302 Asst Plt Cmdr (Line no. 18 - T/O 10271); one (1) Sgt 0341, Ammo NCO (Line no. 20); one (1) Pvt (0311) messenger/driver (Line no. 24)	1. New Platoon Hq strength 1-2; 3 billets available for reassignment
1.5. Rearm rifle companies mortar sections w/LWCMS (no manpower changes from current T/O)	1.5. Acquisition of 9 60mm LWCMC mortars (XM224), 3 per rifle company	2. Reduce number of 81mm sections from 4 to 2 (Line no. 25)	2. Total of 38 billets available
		3. Reduce 81mm mortar squad from 7 to 5 by reducing ammo men (Pvt 0341 - Line no. 38) from 4 to 2	3. New squad strength = 5; section headquarters unchanged; section strength = 15; total of 8 billets available
		4. Add 2 3-tube sections of 60mm (XM224) LWCMS mortars as follows: a. Section leader - Sgt (E-5) 0341 - total 2 b. Squad leader/Gunner - Cpl (E-4) 0341 - total of 6 (3 per section) c. Asst Gunner - LCpl (E-3) 0341 - total of 6 (3/sect) d. Ammo man - Pvt (E-1) 0341 - total of 6 (3/sect)	4. Requires 20 billets from effects 1.-3., above as follows: a. Add Sgt (E-5) 0341, Forward Observers (total of 2) to become LWCMS section leader Sgt (E-5) - total of 2 b. Add Cpl (E-4) 0341 Ammo NCO (total of 2) and Cpl (E-4) 0341 81mm squad leaders (total of 4) to become LWCMS squad ldr c. 6 of 8 LCpl (E-3) Gunner and Asst Gunner (81 sqd) to become LWCMS Asst Gunner (total of 6) d. 6 of 8 Pvt (E-1) Ammo men (81) to become LWCMS Ammo men

IMPLEMENTATION

FY 82/83

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
			5. 29 billets remain available
2. Reconfigure all infantry rifle squads from 13-man to 2 5-man fire team, 11-man rifle squads	1. One (1) additional M203 per rifle squad - total of 9 per rifle company (27 per battalion)	1. Change number of fire teams per rifle squad (Line no. 52 - T/O 1013I) from 3 to 2 2. Change rank of Grenadier/ Rifleman (line no. 55 - T/O 1013I) from Pvt (E-1) 0311 to LCpl (E-3) 0311 3. Add billet of Assault/rifle-man, Pvt (E-1) 0311 with M16/M203 to each fire team	1. Creates 54 billets available
3. Delete all rifle platoon guides (E-5) 0311 (Line no. 48 - T/O 1013I)	1. None	1. Delete line no. 48 - T/O 1013I	1. Creates 9 billets available
4. Delete all rifle company supply sergeant (E-5) 0311 billets (Line no. 6 - T/O 1013I)	1. None	1. Delete line no. 6 - T/O 1013I	1. Creates 3 billets available
5. Delete 7 billets from Service Platoon	1. None	1. Delete as follows (T/O 1037I): a. Line no. 106 - Cpl (E-4) 3043 from 2 to 0 - total of 2 b. Reduce line no. 112 - LCpl (E-3) 3051 from 2 to 1 - total of 1 c. Reduce line no. 113 - Pvt (E-1) 3043 from 2 to 1 - total of 1	1. Creates 7 billets available a. Change Plt Hq from 1-4 to 1-2 b. - c. Change Supply Section from 0-8 to 0-6

IMPLEMENTATION

FY-82/83

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
		d. Reduce line no. 132 Cpl (E-4) 3371 from 3 to 2 - total of 1 e. Reduce line no. 134 LCpl (E-3) 3371 from 8 to 5 - total of 3 f. Increase line no. 136 Pvt (E-1) 3371 from 2 to 3	d.-e.-f. Change Dining Facility Section from O-19 to O-16 2. New service platoon strength now 2-46
6. Delete 11 billets from Communications Platoon	1. None	1. Delete as follows: a. Line no. 68 - LCpl (E-3) 2841 from 1 to 0 - total of 1 b. Line no. 79 - LCpl (E-3) 2512 from 3 to 2 - total of 1 c. Line no 80 - Pvt (E-1) 2512 from 8 to 3 - total of 5 d. Line no. 85 - Cpl (E-4) 2531 from 4 to 3 - total of 1 e. Line no. 86 - LCpl (E-3) 2531 from 6 to 4 - total of 2 f. Line no. 87 - Pvt (E-1) 2531 from 6 to 5 - total of 1	1. Creates 11 billets available a. Change Plt Hq from 1-8 to 1-7 b.-c. Change Wire Section from O-14 to O-8 d.-e.-f. Change Radio Section from O-19 to O-15 2. New Comm Plt strength = 1-63

X-40

IMPLEMENTATION

FY 82/83

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
7. Create Special Infantry Troop (4-109) as per structure "C" T/O	1. 36 additional M203s (12 per platoon; 4 per 11-man squad; 2 per 5-man fire team 2. Additional officer strength of 1 Lt (O-2) 0302 and 3 Lt (O-1) 0302 3. Proper realignment of MOSs to infantry type	2. Using following available billets from actions 1.-6. above: a. 29 fr: mortars b. 54 fr: new squad size c. 9 fr: no plt guides - 9 Sgt (0311) squad leaders d. 3 fr: no co. supply sgts e. 7 fr: Service Plt f. 11 fr: Comm Plt 113	1. Creates battalion's fourth maneuver element
8. Create Legal Section in S-1	1. None	1. Reduce line no. 20 (T/O 10371) Cpl (E-4) 0151 from 2 to 1 = total of 1 2. Reduce line no. 22 (T/O 10371) Pvt (E-1) 0151 from 2 to 1 3. Add one (1) Cpl (E-4) 4421, Legal Services man 4. Add one (1) Pvt (E-1), 4421, Legal Services man	1. Provides Legal Services capability

X-41

IMPLEMENTATION

FY 82/83

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
9. Provide administrative capability to companies	1. None	1. Reduce S-1 section as follows: a. Line no. 19 (T/O 1037I) Sgt (E-5) 0151 from 2 to 1 - total of 1 b. Line no. 21 (T/O 1037I) LCpl (E-3) 0151 from 2 to 0 - total of 2 c. Line no. 158 (T/O 1037I) LCpl (E-3) 0151, from 1 to 0 - total of 1 d. Add one (1) LCpl (E-3) 0151 to each rifle co. hq - total of 3 e. Add one (1) LCpl (E-3) 0151 to the weapons company hq - total of 1	1. S-1 section strength now 2-17 (plus Career Planner - not changeable = 2-18) 2. Each company possesses trained administrative capability 3. Rifle Co Hq now 2-4 4. Weapons Co. Hq now 2-7
10. Enhance NBC capability	1. None	1. a. Delete line no. [illegible] (T/O 1037I), Sgt (E-3) 0311, Supply Sergeant from 1 to 0 - total of 1 b. Add one (1) Cpl (E-4) 5711, NBC Specialist to S-3 section	1. Reduces Co Hq, H&S Co from 2-3 to 2-2 2. [illegible] strength from 8-5 to 8-6

X-42

IMPLEMENTATION

FY 82/83

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
11. Complete forming Heavy Machinegun Section of Weapons Company	1. None	1. Delete line no. 6 (T/O 10271) Sgt (E-5) 0311, Ops Sgt from 1 to 0 - total of 1	1. Weapons Co Hq now 2-6
		2. Add one (1) Pvt (E-1) 0341, Ammo man, driver - Heavy Machinegun Section Hq	2. HMG Section strength now 9-19
12. Redesignate Weapons Company as "Combined Arms Company"	1. None	1. None	1. N/A

Bn strength = 889

X-43

IMPLEMENTATION

FY 84/85

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
1. Authorize Infantry Battalion T/O strength to increase from 889 USMC (off, enl) to 916 USMC (off, enl)	1. 27 additional personnel per battalion	1. N/A	1. Allows final forming of 1990's battalion - structure "C"
2. Create TOW Section to Anti-armor Platoon, Combined Arms Company (4 squads, 5 men per squad)	1. 3 TOW launchers, 13 M151 jeeps (or appropriate vehicle), 6 trailers; 22 personnel	1. Add 0-22 personnel to Anti-armor Platoon as follows: a. One (1) SSgt (E-6) 0369 - Section leader b. One (1) Sgt (E-5) 2875 TOW Technician c. Four (4) Sgt (E-5) 0352 Squad Leaders d. Eight (8) Cpl (E-4) 0352 Gunners e. Eight (8) Pvt (E-1) 0352 Asst Gunners/drivers	1. Increases battalion strength from 889 to 911 (USMC, off, enl) 2. Anti-armor Platoon strength now 1-76 3. Combined Arms Company strength now 8-262
3. Complete forming of Combined Arms Company HQ	1. One (1) officer Capt (O-3) 0302	1. a. Redesignate Lt (02) 0202 from Executive Officer to Company Operations Officer b. Add one (1) Capt (O-3) 0302 as CA Executive Officer	1. Co Hq now = 3-6 2. Combined Arms Company now = 9-262 3. Bn strength = 912

X-44

IMPLEMENTATION

FY 84/85

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
4. Enhance Sniper capability	1. 3 Pvt (E-1) 0311	1. Redesignate line no. 10 (T/O 1013I) Pvt (E-1) 0311 to messenger/scout with add d[illegible] mos of 854I	1. No strength change
		2. Add one (1) Pvt (E-1) 0311 to each rifle company hq (line no. 10, T/O 1013I) - total of 3 increase in battalion	2. Increase rifle company hq strength to 2-5 3. Increase battalion strength to 915
5. Increase S-3 Section	1. One (1) LCpl (E-3) 0151	1. Add one (1) LCpl (E-3) 0151 to S-3 Section (T/O 1037I)	1. Increase S-3 Section from 8-6 to 8-7 2. Increase H&S Company strength to 20-154 3. Increase battalion strength to 916
6. Complete Communications Platoon preparation for MTACCS	1. None	1. a. Delete one (1) LCpl (E-3) 2542 T-T Opr/driver (line no. 74, T/O 1037I) b. Add one (1) Pvt (E-1) 2542, Message Center man/ driver	1. None

X-45

IMPLEMENTATION

FY 84/85

ACTION	RESOURCES REQUIRED	METHODOLOGY	EFFECT
7. Anticipate multiple strategic transit means NOTE: As this change requires no changes in end strength or grade change, a better determination of requirements during FY-84/85 may preclude this change).	1. None	1. a. Delete one (1) Lt, 3502, MTO (line no. 119, T/O 1037I) b. Add one (1) Lt, 0430, Embarkation Officer, w/desired 2d mos of 3502	1. a. Reduces MT Section strength from 1-19 to 0-19 and Service Platoon from 2-46 to 1-46 b. Increases S-4 Section strength to 3-4 and bn hq element to 16-34

X-46

--Complete--

Strength = 916

XI. ENHANCED STRUCTURE "C"

As indicated by CMC as desirous during the study group's briefing in June 1980, a final input to this study deals with an "enhanced" (i.e., "unconstrained") version of structure "C". The study group determined that "unconstrained" should not imply "carte blanche" addition of personnel, for to do so would ignore manpower availability realities which, even in periods of declared conflict, may not be as limitless as one would assume. Therefore, the study group approached this additional task as one in which it could be indicated for future programming those additional personnel which, when added to structure "C", would materially enhance its ability to shoot, move and communicate.

The study group reviewed the vast range of additional personnel which could conceivably be included in an enhanced T/O of structure "C" and quickly realized that the much greater potential manpower strength of the battalion would not necessarily be justified in terms of marginal ability gained. Therefore, using a technique developed earlier in this study effort, the study group applied those scores generated by the advisory panel, which evaluated design attributes by importance of their contribution to the unit mission and which appear in figure V-6 (page V-35) of this report, and calculated varying tradeoffs which could prioritize the range of possibilities.

Mindful that, heretofore, this study has heavily weighted tradeoffs within the 916 bracket in favor of those which would contribute to firepower and maneuver, the study group carefully gave additional consideration to those other services and capabilities also vital to the support of the infantry battalion.

The result of this evolution is a prioritized list of units/ personnel which appears below (in descending order) which the study group would include in addition to the T/O of structure "C" which appears in this report. The enhanced version of structure "C" essentially reestablishes previous levels of communicators, supply personnel, motor vehicle and weapons maintenance personnel, enhances mortar fire direction control and creates a full fourth maneuver element (rifle company), as follows:

Priority	Billet (Unit)	Rank	MOS	Increase
1	Field Radio Operator	Cpl	2531	+1
	Field Radio Operator	LCpl	2531	+2
	Field Radio Operator	Pvt	2531	+2
	Bn strength 921 (47-874)			
2	Supply Admin Man	Cpl	3043	+2
	Gen. Warehouseman	LCpl	3051	+1
	Fiscal Clerk	LCpl	3043	+1
	Bn strength 925 (47-878)			
3	Motor Transport Officer	Lt	3502	+1
	Auto Mechanic	Pvt	3521	+1
	Infantry Wpn Repairman	Pvt	2111	+1
	TOW Technician	LCpl	2875	+1
	Bn strength 929 (48-881)			
4	Weapons Plt (as per any rifle company in structure "c")			+42
	Admin Clerk	LCpl	0151	+1
	Bn strength 972 (49-923)			
5	Ammunition NCO (Mortar Plt Hq)	Sgt	0341	+1
	FDC Computer Operators (Mortar Plt Hq)	LCpl	0341	+2
	Bn strength 975 (49-926)			

Priority	Billet (Unit)	Rank	MOS	Increase
6	NBC Specialist	Cpl	5711	+1
	Bn strength 976 (49-927)			
7	Cook	Sgt	3371	+1
	Cook	Cpl	3371	+2
	Cook	LCpl	3371	+4
	Cook	Pvt	3371	+3
	Bn strength 986 (49-937)			

The study group agrees that this level of infantry battalion strength, requiring 1 officer and 69 enlisted personnel above the T/O of structure "C" would significantly "enhance" the full spectrum of organic capabilities. A schematic diagram of this enhanced version of structure "C" follows:

"ENHANCED" STRUCTURE "C"

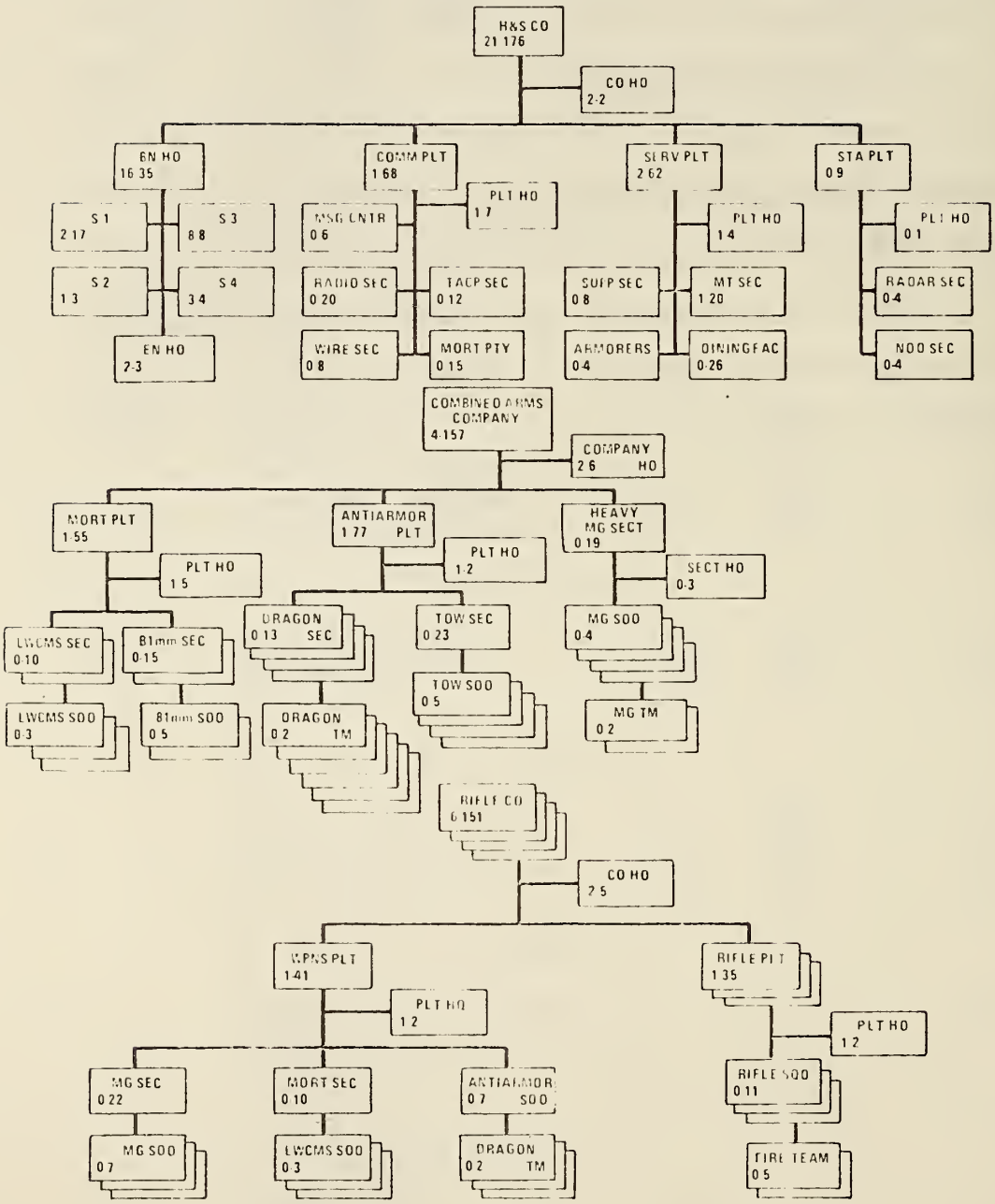
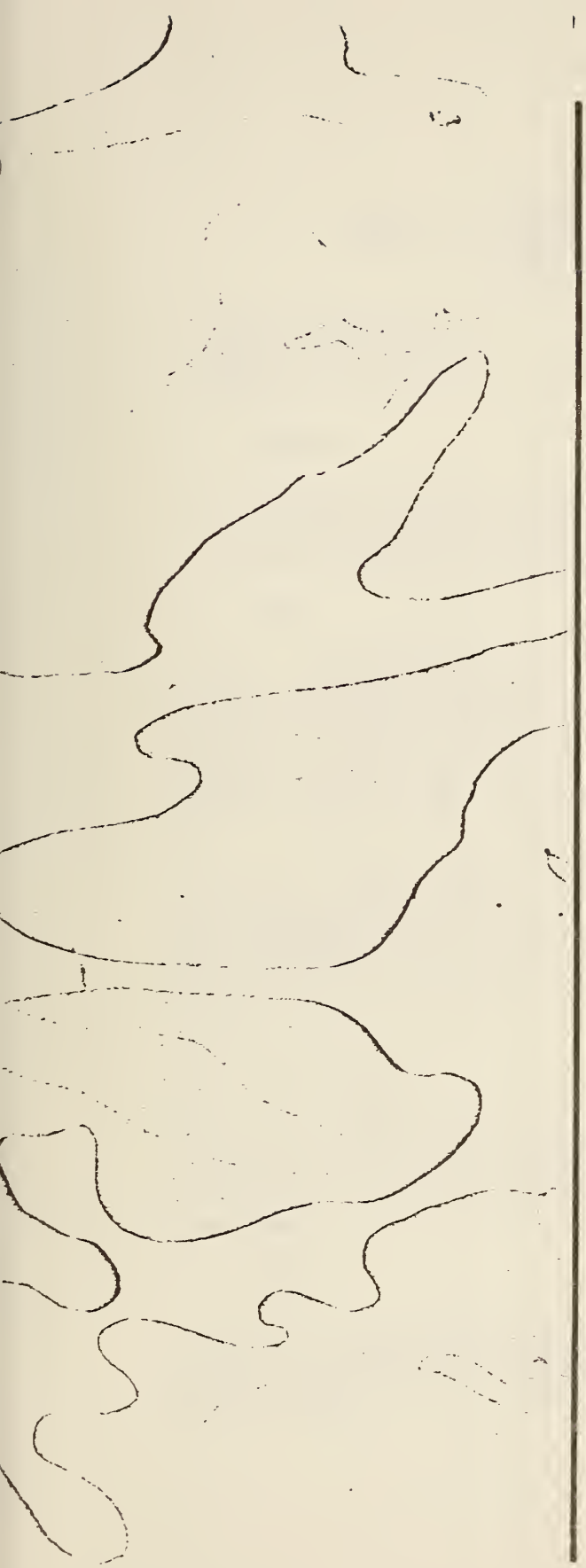


Figure XI-1 Enhanced Structure "C"

SECTION XII DRAFT OPERATIONAL HANDBOOK

This section is an initial effort to collect the background, description, information, and techniques related to the recommended structure(s). Included in this draft handbook are tables of organization, implementation plans, and some tactical and organizational techniques associated with the proposed eleven-man rifle squad.

This draft handbook is not doctrinal, and is provided to assist in the implementation of the recommended structure(s), if such decision is made. Reference is made to the "C" Series Table of Organization throughout the draft hand book, only because there is at present no formal identifying term for the proposed structure. The use of the term "C" Series provides consistency with textual references to the structure as alternative "C".



OPERATION OF THE INFANTRY BATTALION

SEMPER PROGREDI

OCT 80

COMMANDING GENERAL
MARINE CORPS DEVELOPMENT
AND EDUCATION COMMAND
QUANTICO, VIRGINIA 22134

UNITED STATES MARINE CORPS
Marine Corps Development and Education Command
Quantico, Virginia 22134

OPERATIONAL HANDBOOK
NUMBER.....6-3

Operation of the
Infantry Battalion

1. PURPOSE

This publication sets forth tactics and techniques to be employed by the Marine infantry battalion utilizing the revised battalion structure as defined by the "C" Series Tables of Organization.

2. SCOPE

a. This handbook provides information and guidance for the Marine infantry battalion commander, his staff, and his subordinate commanders in planning, preparing for, and conducting combat operations under the revised structure. It sets forth the principles applicable to the tactical employment of an infantry battalion consisting of three rifle companies, a combined arms company, and a headquarters and service company in the conduct of offensive and defensive operations.

b. It is intended to be used in conjunction with FMFM 3-1, Command and Staff Action; FMFM 6-3, Marine Infantry Battalion; FMFM 6-4, Marine Rifle Company/Platoon; FMFM 6-5, Marine Rifle Squad; and other FMFM's, as applicable. The contents of this handbook, modified by input from the field, will ultimately result in the revision of current doctrinal publications.

3. APPLICABILITY

This handbook is not directive in nature. It contains unclassified information currently proposed for use by the Fleet Marine Forces and the Marine Corps Development and Education Command. Use of the provisions of this handbook during training exercises is desirable and encouraged.

4. CHANGES

Comments and recommendations on the contents of this handbook are invited. Correspondence should be addressed to the Commanding General, Marine Corps Development and Education Command (Code D 036), Quantico, Virginia 22134.

5. CANCELLATION

This handbook shall remain effective until cancelled by Marine Corps Bulletin 5600 listing effective Marine Corps doctrinal and related publications.

J. H. MILLER
Lieutenant General, U.S. Marine Corps
Commanding General

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CG FMFLANT	(50)	CG 1ST MARDIV	(200)
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DIR DEVCTR		CG 3D MARDIV	(100)
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M&L	(10)	CG 1ST MAW	(25)
FIREPOWER	(10)	CG 2D MAW	(25)
INTEL	(10)	CG 3D MAW	(25)
C^3	(10)	CG 4TH MAW	(25)
MCDSA	(5)	CG 1ST FSSG	(50)
A&S	(5)	CG 2D FSSG	(50)
DC	(5)	CO 3D FSSG	(50)
MCDEC LIAN OFFS		CG 1ST MARBRIG	(50)
DIR EDCTR		CG 4TH MAB	(100)
C&SC	(375)	CG 9TH MAB	(100)
AWS	(800)	CG MCAGCC	(100)
COS	(200)	CG LFTCLANT	(25)
TBS	(2000)	CO LFTCPAC	(25)
RLT	(300)		
PUBS	(300)		

TABLE OF CONTENTS

SECTION 1. BACKGROUND

Paragraph

101 Summary of Reorganization Decisions
102 Evaluation of "C" Series T/O Infantry Battalion

SECTION 2. ORGANIZATION AND COMMAND

201 Introduction
202 Infantry Battalion Organization
203 Headquarters and Service Company
204 Combined Arms Company
205 Rifle Company

SECTION 3. IMPACT OF REORGANIZATION

301 General
302 Overall Impact
303 Operational Impact

SECTION 4. OPERATIONS

401 Introduction
402 Organization for Combat
403 Zones of Action
404 Forms of Maneuver
405 Combat Formations
406 Reserve in Offense
407 Defense
408 Defensive Frontages
409 Reserve in Defense
410 Night Attacks

SECTION 5. AMPHIBIOUS/MAGTF OPERATIONS

501 General
502 Concept of Employment
503 Ship-to-Shore Movement

SECTION 6. FIRE SUPPORT

601 General
602 Principles of Fire Support Coordination

603 Fire Support Coordinating and Limiting Measures
604 Fire Support Coordination Center
605 Organic Weapons Support
606 Supporting Arms

SECTION 7. COMBAT SERVICE SUPPORT

701 General
702 Impact

SECTION 8. COMMUNICATIONS

801 Introduction
802 Communication Considerations
803 Utilization of Communication Assets
804 Communication Security
805 Flexibility

APPENDIX A TABLES OF ORGANIZATION

APPENDIX B IMPLEMENTATION PLAN

APPENDIX C 11-MAN RIFLE SQUAD COMBAT FORMATIONS

SECTION 1

BACKGROUND

101. SUMMARY OF REORGANIZATION DECISIONS

a. On 16 February 1979, the Commandant of the Marine Corps announced the reorganization of the infantry battalion to become effective on 1 August 1979 for the active forces and 1 October 1979 for the reserve forces. The stated purpose of the reorganization was to provide improved and uniform readiness throughout the four Marine Divisions plus increased firepower, centralized fire support control and enhanced sustainability on the battlefield. The reorganized battalion, termed the "X" Series Table of Organization, (T/O) consisted of an H&S Company, Weapons Company and three rifle companies, with a total USMC strength of 1,043.

b. Concurrently, the Commandant of the Marine Corps directed the Commanding General, Marine Corps Development and Education Command, Quantico, Virginia, to undertake a study effort to determine the "...optimum infantry battalion structure." This effort was to determine the composition of the USMC infantry battalion more suited for combat in the 1980's but whose total personnel strength (USMC officers and enlisted) would remain at "...about 900."

c. Prior to the implementation of the new T/O, it was determined that the distribution of personnel within the Marine Corps would not support the full implementation of the "X" Series T/O by 1 August 1979. It was therefore decided that separate T/O's were needed for FMFPAC and FMFLANT infantry battalions. The "X" Series T/O was retained for

FMFLANT and a modified version, or "I" Series T/O was developed for FMFPAC. These T/O's were implemented within the active forces on 1 August 1979. It was later determined that the Fourth Division would maintain its current structure until the optimum T/O for the Eighties was determined. Still later, it was directed that FMFLANT would also be restructured about the "I" Series T/O, effective 1 December 1979.

d. Currently, all active division Marine Corps infantry battalions are structured from the "I" Series Table of Organization.

e. During August 1980, the Commanding General, Marine Corps Development and Education Command, Quantico, Virginia forwarded a study package to the Commandant of the Marine Corps recommending adoption of an infantry battalion structure deemed "optimal" for the 1980's within the personnel constraint of "...about 900." Upon review, this structure was approved by the Commandant of the Marine Corps on This structure has been designated the "C" Series Table of Organization.

f. This Operational Handbook provides initial detailed information regarding the "C" Series structure and the tactics and techniques of its combat employment. Modifications to these methods are envisoned to result from rigorous field testing and ultimate operational functioning. In this regards, this handbook is an interim supplement to published doctrine and provides a means for evaluating and modifying tactics and techniques prior to incorporation into the more doctrinally established FMFM's.

g. Section II provides information relative to the "C" Series Table of Organization and its planned implementation. Section III

addresses the impact of this structure on doctrine, tactics and techniques. Remaining sections discuss other considerations applicable to this structure.

102. EVALUATION OF "C" SERIES T/O INFANTRY BATTALION

a. All Marines are encouraged to submit their evaluation and suggestions concerning positive, combat-oriented improvements to the "C" Series T/O Infantry Battalion to the Commanding General, Marine Corps Development ad Education Command (Director, Development Center), Quantico, Virginia 22134.

SECTION 2

ORGANIZATION AND COMMAND

201. INTRODUCTION

This chapter provides detailed background information regarding the "C" Series Table of Organization. It includes the information contained in the T/O cover sheets for the Infantry Battalion, H&S Company, Combined Arms Company and the Rifle Company, expanded where necessary to provide a more comprehensive analysis of the revised structure.

202. INFANTRY BATTALION ORGANIZATION

a. General. The Marine infantry battalion is the basic tactical unit of ground combat power in the Marine Co ps. It provides the nucleus of the battalion landing team (BLT) for amphibious operations and the Marine Amphibious Unit (MAU) for air-ground task force operations. It is a balanced force capable of performing a variety of missions. The battalion command structure is capable of integrating the efforts of attached and supporting units and the structure of the battalion facilitates task organization. The subordinate units of the battalion are the headquarters and service company, combined arms company, and rifle companies. (See figure 2-1)

b. Mission. The misson of the Marine infantry battalion is not changed. It is "...to locate, close with, and destroy the enemy by fire and maneuver, or to repel his assault by fire and close combat."

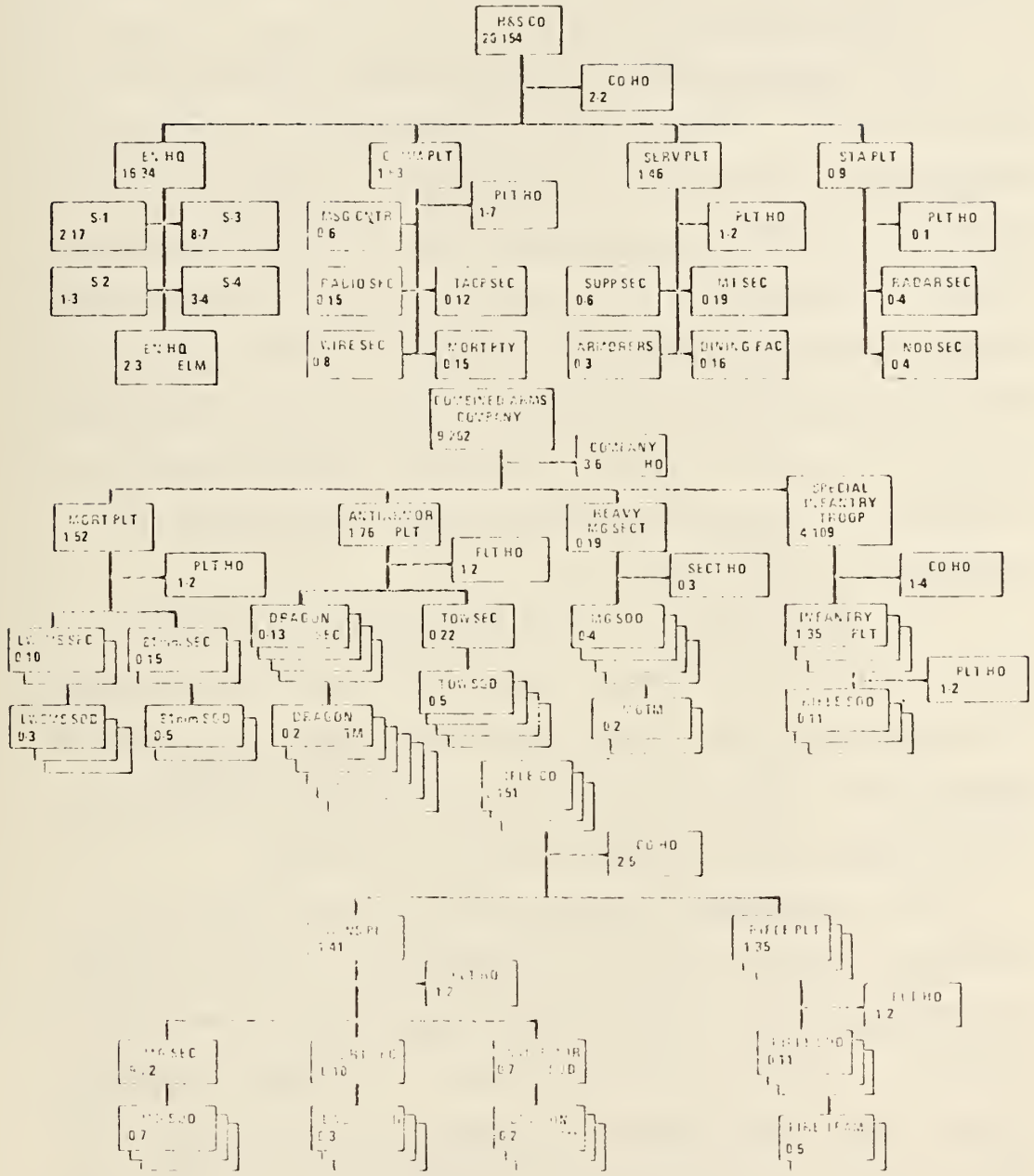


Figure 2-1. Marine Infantry Battalion Oganization

c. Command and Control

(1) Command and Staff. Command and staff functions are exercised through a compact operational command group consisting of the commander and executive staff. The staff is capable of integrating the efforts of attached and supporting units, utilizing representatives of these elements provided for this purpose. The staff is capable of supporting an alternate command post during displacement. All fires in support of the battalion are coordinated under the staff cognizance of the operations officer. Advice in fire support coordination matters is provided by the fire support coordinator and liaison personnel from supporting or attached units.

(2) Communications. Communication means are provided to maintain reliable and continuous communication channels to subordinate and attached units, and to higher headquarters. The primary method of communications to subordinate units is by voice radio, supplemented by continuous wave (CW), radio relay, wire, and messengers.

(3) Intelligence. The battalion intelligence section is organized to provide surveillance, reconnaissance, and target acquisition commensurate with fire and maneuver capabilities of the battalion. Information, collected by subordinate units as an integral byproduct of their normal combat functions, is translated rapidly and informally into intelligence in the formulation of command decisions. The organic intelligence section of battalion headquarters is capable of limited intelligence processing. Intelligence data collected is forwarded to higher and adjacent echelons.

(4) Firepower. In addition to individual weapons, the organic battalion firepower consists of medium and light mortars, heavy, medium and light antimechanized weapons, and heavy and medium machine-guns capable of supporting the rifle companies. Additional fire support is provided by other units of the Marine air-aground task force and other supporting elements, as required.

(5) Mobility. The basic means of mobility is by foot, supplemented by use of organic, small, lightweight vehicles for the transportation of electronic equipment, weapons, and limited amounts of ammunition and supplies. All elements are helicopter-transportable and are compatible with other means of transportation (assault amphibious vehicles, motor transport, fixed-wing aircraft, and ships).

(6) Logistics. Logistic capability is compatible with the mobility and combat power of the battalion. The battalion is structured on the basis of unit distribution of supplies to and within the battalion.

d. Concept of Employment. The battalion is the basic tactical unit of ground combat power and the nucleus of the BLT. As a balanced firepower and maneuver team, it attacks and destroys all targets in its assigned area of responsibility. With attachments, it is capable of independent, sustained operations for periods of several days as permitted by combat conditions. It is capable of conducting a coordinated deliberate defense.

e. Administrative Capabilities. The infantry battalion is capable of self-administration. The battalion headquarters is the administrative center for centralized control of personnel accounting and administration in the entire battalion.

f. Combat Service Support

(1) Maintenance. The battalion performs organizational maintenance (first echelon) of all materiel authorized the battalion, and organizational maintenance (second echelon) of motor transport, ordnance (less fire control instruments), and electronics materiel authorized the battalion.

(2) Medical. The battalion provides emergency treatment and preparation for evacuation by external means of all casualties requiring hospitalization. It provides a battalion aid station for treatment of minor illnesses and injuries and exercises technical supervision of measures for the prevention and control of disease.

(3) Transportation. Transportation means organic to the battalion consists of small, general purpose, helicopter transportable vehicles for command, communications, medical, and crew-served weapons.

(4) Supply. The battalion is capable of organic supply functions. The battalion supply unit coordinates resupply for the companies and maintains a limited level of supply within the battalion.

(5) Dining. The battalion is capable of operating a battalion dining facility in garrison or in the field. When required, it furnishes equipment and cooks to companies for the operation of a limited number of company dining facilities.

203. HEADQUARTERS AND SERVICE COMPANY

a. Primary Mission. To provide the battalion commander with the facilities for command and control, surveillance and target acquisition, and service support for subordinate elements of the battalion.

b. Concept of Organization

(1) Organization. The H&S Company is organized into functional groupings to provide for:

(a) A battalion headquarters which directs and coordinates the operations of the entire battalion.

(b) A company headquarters which coordinates security for the battalion headquarters and combat service support for the battalion.

(c) A communications platoon which provides the communications necessary to command and control the battalion. It is composed of:

1 Platoon headquarters (includes communications maintenance personnel).

2 Message center section.

3 Wire section.

4 Radio section

5 Tactical air control party (TACP) section:

a Air liaison party radio operators.

b Two forward air control parties' radio operators.

6 Mortar support section

(d) A service platoon which provides limited service support to the battalion. It is composed of:

1 Platoon headquarters.

2 Supply section.

3 Armorer section.

4 Transportation section.

5 Dining section.

(e) A surveillance and target acquisition (STA) platoon which provides a limited capability to collect information and to detect personnel and vehicular targets during conditions of reduced visibility. It consists of:

1 Platoon headquarters.

2 Radar section of two radar teams.

3 Night observation section of four night observation device (NOD) teams.

(f) A medical platoon which provides for prevention and control of disease, treatment of minor illnesses and injuries, and emergency treatment and preparation for evacuation by external means of all casualties within the battalion requiring hospitalization. It is composed of:

1 One battalion aid station of two echelons.

2 Four company medical teams.

(g) A chaplain section which supervises and coordinates the religious program of the command.

(h) Headquarters and Service Company organizational diagrams

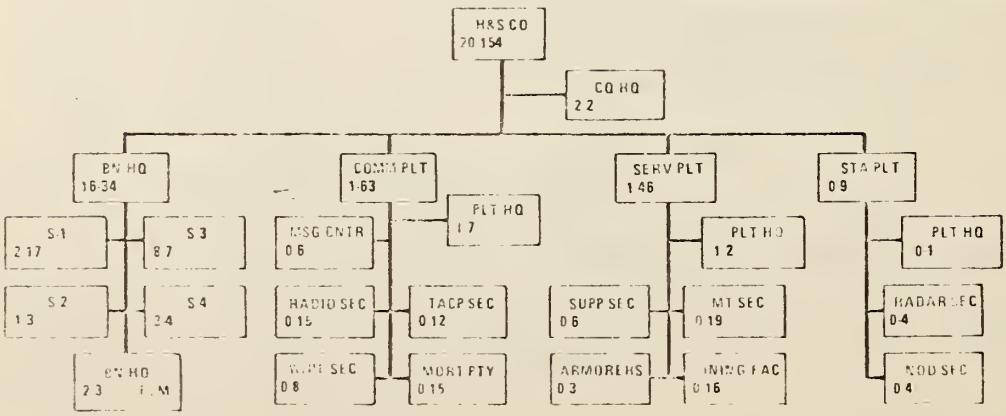


Figure 2-2. Headquarters and Service Company - T/O 1037C

(2) Command and Control

(a) Command and Staff. The company commander and his staff direct and control all matters pertaining to the combat service support and security of the company and the battalion headquarters.

(b) Communications. Internal communications are limited to telephone and messenger service.

(c) Intelligence. Limited information collection, processing, and dissemination capabilities exist within the surveillance and target acquisition platoon and S-2 section of the battalion headquarters.

(3) Firepower. Firepower available to the company commander is limited to light infantry weapons and machineguns for individual protection and the defense of the battalion headquarters against infiltration by the enemy.

(4) Mobility. The basic means of ground mobility of the company is by foot. Assigned equipment includes lightweight vehicles for the transportation of electronic equipment, a limited number of the headquarters group, and supplies and equipment necessary to sustain the company on a daily basis. All elements are helicopter transportable and are compatible with other means of transportation (assault amphibious vehicles, motor transport, fixed-wing aircraft, and ships).

(5) Combat Service Support. Combat service support for the company is provided by organic service support elements.

c. Concept of Employment. The company headquarters is employed primarily to coordinate combat service support, security, and facilities for the company and the battalion headquarters. The physical layout of, support of, and displacements incident to the battalion headquarters

are directed toward providing the battalion commander and his staff with the most effective means for directing and controlling the battalion. The surveillance and target acquisition, communications, medical and service platoons of this company function in operational roles within the entire battalion.

d. Admininstrative Capabilities. The S-1/adjutant section of the battalion headquarters operates a battalion administrative center for centralized control of personnel accounting and administration.

e. Combat Service Support

(1) Maintenance

(a) All elements of the company are capable of providing organizational maintenance (first echelon) on assigned equipment.

(b) Organizational maintenance (second echelon) is provided by the service platoon for all battalion motor transport and ordnance (less fire control instruments) and by the communication platoon on battalion communication equipment and surveillance radars.

(2) Medical. The battalion medical platoon provides emergency treatment for casualties and the preparation for evacuation by external means of those casualties requiring hospitalization. The medical platoon provides treatment for minor illnesses and injuries and is capable of operating two aid stations during combat operations. It also exercises technical supervision of measures for the prevention and control of disease.

(3) Transportation. Transportation for the headquarters and service company is provided by vehicles maintained within the service platoon. Vehicles are allocated within the battalion for the purpose

of providing transportation for command, staff, and liaison personnel; communication equipment; crew-served weapons and their basic load of ammunition; emergency medical evacuation; and supply distribution within the battalion.

(4) Supply

(a) The service platoon receives supplies and provides for their distribution within the battalion.

(b) The company headquarters receives supplies for internal support of the company and provides for distribution.

(5) Dining. The service platoon operates dining facilities for the battalion. When required, the service platoon furnishes cooks and equipment to rifle companies for the operation of company dining facilities.

204. COMBINED ARMS COMPANY

a. Primary Mission. To provide an array of indirect fire, anti-armor, heavy machinegun, anti-helicopter air defense, and counterattack support to suppress and/or neutralize enemy defenses of his advance within the battalion's area of influence, and to support the destruction of enemy forces during close combat.

b. Concept of Organization. The combined arms company consists of a company headquarters, a mortar platoon, an antiarmor platoon, heavy machinegun section, and a special infantry troop (see Figure 2-3).

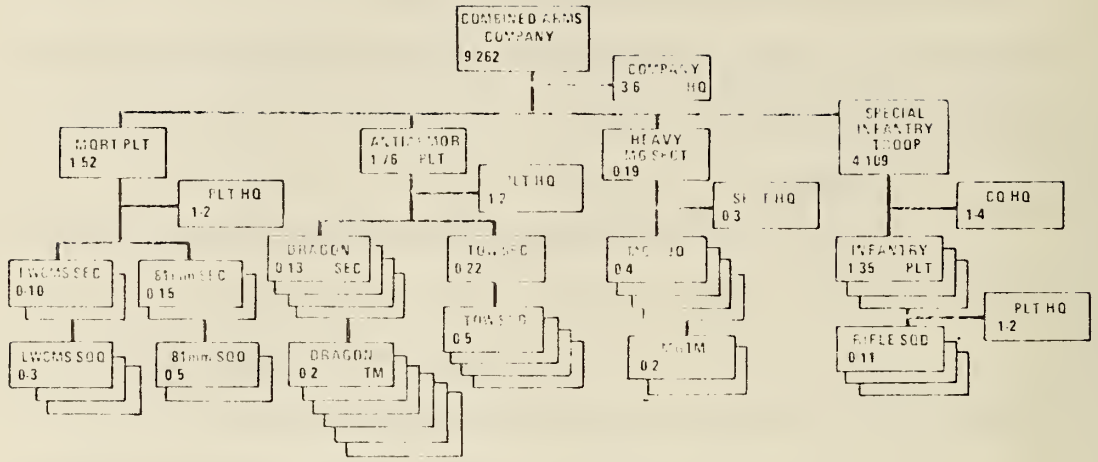


Figure 2-3. Combined Arms Company - T/O 1027C.

(1) Command and Control

(a) Command and Staff

1 Subordinate elements of the company are employed in support of the battalion or attached, as directed by the battalion commander.

2 The company commander, with his company headquarters, performs the functions necessary for efficient planning, direction, and supervision in execution of assigned missions.

(b) Communications

1 Communication equipment is provided by the battalion.

2 The primary means of communication for subordinate elements of the company is voice radio supplemented by wire, messenger, and visual signals.

3 Subordinate elements of the company are capable of using voice-radio communications internally with the battalion command

post, and with supported units when equipped with communication equipment provided by the battalion.

(c) Intelligence

1 There is no specialized reconnaissance or surveillance capability within the weapons company.

2 The subordinate elements of the company collect information in the course of operations by direct observation and from enemy personnel and materiel. Combat intelligence is limited to expediting the transmission of information to the battalion command post.

(2) Firepower

(a) The firepower of the combined arms company consists of medium and light (weight) mortars, heavy and medium antiarmor weapons, heavy and medium machineguns, and individual weapons.

(b) The mortar platoon contains four medium mortars (81mm) and six light (weight) mortars (60mm) capable of providing indirect fire support to the battalion and its subordinate elements.

(c) The antiarmor platoon contains four (6-team) sections of medium antiarmor-guided missile systems (DRAGON) and four (2-team) squads of mounted, heavy antiarmor-guided missile systems (ITOW) capable of providing antiarmor support to the battalion and its subordinate elements.

(d) The heavy machinegun section contains four (2-team) squads of heavy machineguns capable of providing long-range, direct fire, anti-personnel, antiarmor, and primitive air defense (versus attack helicopters) support to the battalion and its subordinate

elements. It is envisioned that this section will ultimately be equipped with more sophisticated air defense assets.

(e) The special infantry troop consists of the maneuver assets (i.e., rifle platoons) of a rifle company and provides the battalion with a fourth maneuver unit, when required, and a constant reserve force, otherwise.

(3) Mobility. The basic means of ground mobility for the combined arms company is by foot, supplemented by the use of vehicles organic to the battalion for the transportation of weapons and limited amounts of ammunition and supplies. All elements are helicopter transportable and are compatible with other means of transportation (assault amphibious vehicles, fixed-wing aircraft, and ships).

(4) Combat Service Support. The combined arms company is capable of movement of a basic load. The internal distribution of supplies to the company is by unit distribution with transportation and medical support provided by the battalion or external sources.

c. Concept of Employment

(1) During combat operations, the subordinate elements of the combined arms company are employed as directed by the battalion commander.

(a) The company commander of the combined arms company functions as the battalion fire support coordinator (if so designated by the battalion commander), assisted by the battalion air officer and the (if attached) artillery liaison officer, and is located within the battalion FSCC.

(b) The company executive officer of the combined arms company functions as the Special Infantry Troop Commander and is located with this unit to direct and control it in the execution of its mission.

(c) The company operations officer (and the remaining company headquarters staff) functions as the company commander's direct liaison with his subordinate elements, coordinating their combat support employment (particularly during displacement) and ensuring combat service support is provided to them. As such, he is located with the subordinate element of immediate concern.

(2) The mortar platoon is normally employed as a unit under centralized control of the battalion commander. This platoon can engage targets with either massed fires or by individual (i.e., section) target servicing. The platoon contains four mortar sections (two medium, two light) to support four maneuver elements. Each section is capable of independent communications and fire direction control, if required. Medium mortar sections (81mm) each contain a forward observer; light mortar sections do not contain a forward observer as requesting units (i.e., rifle companies) for these mortars are trained as to this type of call-for-fire. This platoon is capable of continued indirect fire support to the battalion and its subordinate elements during periods of displacement by echelon.

(3) The antiarmor platoon is normally employed under centralized control of the battalion commander. The heavy antiarmor section (ITOW) is organized into four squads and the medium antiarmor assets (DRAGON) into four sections. Hence, either type antiarmor system can

support any or all maneuver elements, if required, by attachment (or OPCON). Due to the ITOW section being vehicularly-mounted, however, it is envisioned that this section will normally operate as a section, quickly maneuvering under centralized control to engage the enemy's main armored thrust. DRAGON sections, being foot-mobile, are more likely to be used for rifle company reinforcement, although even this may not be as crucial as before in that rifle companies, too, maintain some DRAGON (team) assets.

(4) The heavy machinegun section is normally employed under centralized control of the battalion commander. Equipped with either the M2, .50 caliber machinegun or the Dover Devil (a lighter weight, heavy caliber machinegun capable of firing either .50 caliber or 20mm rounds), this section can be employed in a variety of roles--antipersonnel, long-range direct-fire antiarmor (critical when battlefield obscuration limits wire-guided missile use) and as a primitive means of air defense against attack and assault helicopters. Organized into four squads (two guns each), this section can provide support to any or all maneuver elements, if required, by attachment (or OPCON). Full utility of this section can be enhanced by providing it with mobile assets with which it can rapidly maneuver about the battlefield. When so mounted, this section can also carry one medium machinegun (M60) per team. If required to be foot-mobile, this section is capable of transporting one heavy machinegun per squad (4 per section) or as an alternative, one bipod-mounted medium machinegun per team (2 per squad, 8 per section). It is envisioned that this section will ultimately be equipped with man-portable air defense missile systems (e.g., STINGER

or STINGER POST) and is organized to accommodate this future primary role.

(5) The Special Infantry Troop is employed as a unit under the centralized control of the battalion commander. This unit's primary role is to provide the battalion commander with a sufficient-size force to serve as his battalion reserve, thereby allowing him to fight with three full-maneuver elements at his discretion; its secondary role is to serve as the battalion commander's fourth maneuver element, if so required. This unit can be augmented from the assets of the combined arms company (each sub-unit is provided with a fourth section or squad for this eventuality) as required. This unit is not intended to be fragmented by lesser roles or missions, such as command post security, etc.. Judicious planning can capitalize on the ultra-light characteristic of the Special Infantry Troop in assigning its noncon-current missions such as Combat Outpost (COP), reconnaissance, screening, or as the battalion's mechanized infantry force (when a LVT platoon is attached or OPCON to the battalion).

d. Combat Service Support. The weapons company is capable of performing organization maintenance (first echelon) of all authorized materiel and organizational maintenance (second echelon) of the DRAGON weapons system.

205. RIFLE COMPANY

a. Primary Mission. To locate, close with, and destroy the enemy by fire and maneuver or to repel his assault by fire and close combat.

b. Concept of Organization. The rifle company consists of a company headquarters, a weapons platoon, and three rifle platoons.

(1) Rifle Company (3)

(a) Company headquarters.

(b) Weapons platoon:

1 Platoon headquarters.

2 Machinegun section of three machinegun squads with two machinegun teams in each squad.

3 Antiarmor squad of three antiarmor teams with three DRAGON missiles per team.

4 60mm mortar section of three squads with one 60mm mortar each.

(c) Three rifle platoons:

1 Platoon headquarters.

2 Three rifle squads with two, five-man fire teams in each squad.

(2) Rifle Company T/O organizational diagrams

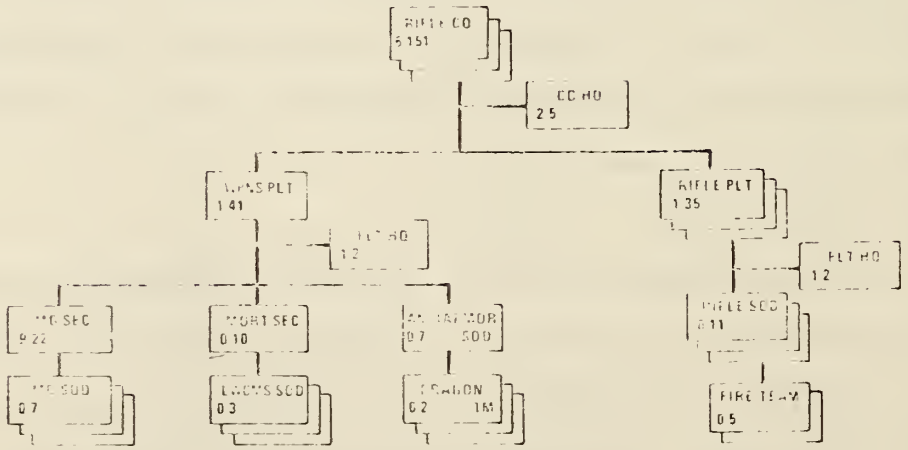


Figure 2-4. Rifle Company - T/O 1013C.

(3) Command and Control

(a) Command and Staff

1 A company commander with his company headquarters performs command and staff functions necessary for efficient planning, direction, and supervision in the execution of assigned missions.

2 When the company forms the nucleus for a task organized unit, the supporting commanders will have additional functions as advisors in their supporting roles to the company commander.

(b) Communications

1 Communication equipment is provided by battalion.

2 When equipped, the rifle company is capable of effecting rapid and reliable communications between the company headquarters and subordinate and higher headquarters.

3 The primary method of communications is voice radio with alternate means by messenger, wire, and visual devices.

4 The company voice radio net links with the rifle and weapons platoon headquarters.

(c) Intelligence

1 Combat intelligence at the company level is limited to expediting the transmission of information to the battalion command post.

2 The rifle company collects information by direct observation, patrolling, and from enemy personnel and materiel. There is no organic specialized reconnaissance or surveillance capability within the rifle company.

(4) Firepower

(a) The rifle platoons possess individual weapons capable of effective semiautomatic and automatic fire and individual area weapons. In addition, the rifle platoons possess a limited capability for attacking fortified positions by use of hand-held assault munitions and close-in defense against armor by use of hand-held antimechanized assault weapons.

(b) The weapons platoon consists of:

1 Machineguns to provide supporting fires for elements in the offense and for the support of immediate and deliberate defenses.

2 Antiarmor weapons to provide effective medium antiarmor fires.

3 Light mortars to provide indirect fire support for the company and its subordinate elements.

4 Demolitions for destruction and reduction of fortified positions and obstacles.

(5) Mobility. The rifle company's organic capability to displace is limited to foot mobility. All elements are helicopter transportable and are compatible with other means of transportation (i.e., assault amphibious vehicles, motor transport, fixed-wing aircraft, and ships).

(6) Combat Service Support. The company is capable of movement of a basic load. The internal distribution of supplies is by unit distribution with transportation and medical support provided by battalion or other external sources.

c. Concept of Employment

(1) The company normally operates as a maneuver element of the infantry battalion or can be employed independently for short periods. With the attachment of supporting elements, it may be task organized for special operations.

(2) In the attack the elements of the company, assisted by organic and/or external supporting fires, maneuver to a position from which they can close with and defeat the enemy.

(3) In the defense the rifle company defends to deny a vital area, to protect a flank, to gain time, to economize forces, or to disorganize and destroy the enemy.

d. Combat Service Support. The rifle company is capable of performing organizational maintenance (first echelon) of authorized materiel.

SECTION 2

IMPACT OF REORGANIZATION

301. GENERAL

Reorganization will impact on the combat operations of elements of the battalion.

302. OVERALL IMPACT

a. Headquarters and Service Company. The sphere of responsibility for the H&S company commander has lessened in scope and allows him to focus his attention more on his duties as headquarters commandant.

b. Combined Arms Company. A more efficient and effective environment for training and maintaining the battalion's crew-served weapons has been created by consolidating those assets within one unit. An entire company staff will be dedicated to this task. The company commander has limited responsibility for the tactical control over these elements as he performs the duties of a special staff officer when assuming the role of the fire support coordinator. The battalion commander exercises tactical control over the employment of the assets of this company.

c. Rifle Company. The new structure's impact on the rifle company will be comparable to that of the combined arms company. The greatest effect under the "C" T/O results from increased firepower and capability provided by the antiarmor squad within the weapons platoon, the increased firepower generated by the 11-man rifle squad (equipped with more M203's and ultimately the squad automatic weapon and SMAW), and the new tactics and techniques associated with a two (5-man) fire team rifle squad.

303. OPERATIONAL IMPACT

a. General. The reorganization of the infantry battalion has changed the operational concepts, tactics, and techniques applicable to its employment as they are discussed in FMFM 6-3. The triangular structure of combat organization is a historically proven combat formation and one upon which most Marine Corps organizational concepts are based. It is a flexible and utilitarian formation which adapts readily and easily to the classic "two up, one back" theme which underlies many Marine Corps tactical concepts, both offensive and defensive. However, the Marine Corps has long recognized the significantly additional enchancements derived from an infantry battalion possessing four maneuver elements. These enchancements include:

- Tactical flexibility.
- Area or terrain control.
- Density of combat support.
- Redundancy.
- Endurance.

The "C" Series T/O, by virtue of a fourth maneuver element whose primary role is as a continuing reserve (the Special Infantry Troop), embraces these enhancements once again.

SECTION 4

OPERATIONS

401. INTRODUCTION

Effects of a reordered infantry battalion can be discerned in the battalion's execution of combat operations. Generally, doctrinal principles as set forth in FMFM 6-3 will not change. These offensive and defensive fundamentals will remain the same, with subtle changes occurring in the techniques of employment. The significantly broader array of weaponry organic to the battalion, plus a return to four maneuver units, provides this unit with extraordinary flexibility to meet and defeat the threat spectrum. This section discusses changes in techniques of employment resulting from the "C" Series Table of Organization.

402. ORGANIZATION FOR COMBAT

a. General. An increased number of maneuver companies gives the battalion commander more flexibility in organizing his forces to accomplish the mission, be it offensive or defensive in nature. Based upon his analysis of the mission, the terrain and weather, the enemy situation and troops and fire support available (METT), he must task organize the forces available to support his scheme of maneuver or plan for defense. In so doing he must allocate sufficient combat power to insure success at decisive points, while at the same time provide for an adequate reserve and sufficient forces to perform necessary secondary tasks such as supporting attacks and security.

With one more maneuver unit in the battalion, the massing of sufficient combat power at the decisive point of the attack or defense becomes a viable means to achieve its intended objective.

b. Offense.

(1) In the offense, the battalion commander normally organizes his force to provide for three elements; a main attack, one or more supporting attacks, and a reserve. When two approaches offer equal opportunities, the commander may not plan main and supporting attacks but may plan means of weighting either attack according to the situation that develops.

(2) Main Attack. The main attack is directed toward the key terrain or that area that best facilitates the accomplishment of the mission. First priority is given to the main attack in allocating combat power. It may be weighted by placement of attached or supporting units, by the allocation of fires and by the positioning of the reserve.

(3) Supporting Attack. A supporting attack is used to assist the main attack. Its purpose may be to deceive the enemy as to the location of the main attack, seize terrain which facilitates the main attack, contain the enemy in one area, or induce the enemy to dissipate his combat power outside the decisive area. The commander allocates the minimum essential combat power to the supporting attack. If the supporting attack achieves greater success than the main attack, it may become the main attack, or the commander may plan to have one unit make a supporting attack initially and then convert it to the main attack when a certain condition is created or a certain area reached.

(4) Reserve. Concurrently with a determination of the size and use of the main and supporting attacks, the commander considers the size and use of the reserve. The reserve consists of all uncommitted maneuver elements and is constituted to provide flexibility, security and a means to influence the action. The reserve is used primarily to facilitiate accomplishment of the battalion mission, to deal with unforeseen contingencies and to exploit success. In the offense, it is normally located to favor the main attack, to provide security to the command and to take advantage of available protection against hostile observation and fire.

c. Defense

(1) After analyzing the mission and the defensive area, the battalion commander formulates a plan of defense consisting of a scheme of maneuver and a plan of fire support. In the defense the scheme of maneuver is the plan for placement and movement of maneuver elements to accomplish the mission. His organization for combat is derived from the scheme of maneuver and considers three broad requirements; forces required on the FEBA, forces for the reserve, and security forces required.

(a) Determination of Forces to be Employed on the FEBA. As the commander analyzes the terrain, he considers the amount of resistance desired on each major avenue of approach. As one technique, he may visualize the number of platoon-sized units required on the FEBA. From this he determines the number of companies required and selects tentative lateral boundaries. The number of companies employed

along the FEBA, and the width of the sector assigned to each depends upon the mission, combat environment, and natural defensive strength of the area to be defended.

(b) Determination of Forces for the Reserve. As the battalion commander is determining the forces required on the FEBA, he concurrently considers the size of the reserve and its location. The reserve is not simply the residue remaining after the allocation of forces to the FEBA. It is an essential element of the battalion commander's defensive plan and is allocated sufficient combat power in consideration of the mission, enemy situation, terrain and combat power available. Reserve positions are selected to provide defense in-depth, all-around defense and flexibility. Positions are normally on or near key terrain features or on major avenues of approach where penetrations from the front or flanks can be blocked.

(c) Determination of Security Forces. In planning his scheme of maneuver for the defense, the battalion commander insures that adequate provision is made for all-around security. The combat power allocated to security forces and the measures taken are determined through a consideration of the mission, enemy situation, terrain, and combat power available. Consideration is given to the degree of security provided by adjacent forces and the security elements of higher headquarters; i.e., the covering force and general and combat outposts.

403. ZONES OF ACTION

The increase in the number of maneuver units in a battalion will restore the area a battalion can physically control. Despite the

reduction in personnel strength reflected in the "C" Series T/O (916) from what has been the historical strength ("M" Series T/O = 1193), frontages are not reduced, as the battalion has been reallocated four maneuver units and due to the enhanced maximum effective range(s) of its organic weapons (e.g., TOW, LWCMS, .50 caliber machinegun, DRAGON (at company levels) and the Squad Automatic Weapon (SAW) at fire team levels).

a. Offense

In the attack, the combat environment (including the battalion strength) determines the size of a battalion frontage. The lateral dispositon of maneuvering units is principally predicated upon ensuring each such unit can achieve and maintain fire superiority within its respective zone of action so that it may continue its maneuver through the objective. Therefore, lateral frontages are not normally broad as compared to defensive frontages. At the battalion level, however, with the "C" Series T/O, the battalion commander can, METT permitting, once again select as an option, to maneuver with <u>three</u> companies "up"; hence, in this sense, and at this level, the battalion attack frontage is greater than when forced to a "two up, one back" alternative as with the "I" Series T/O. As <u>general guidelines</u>, under ideal terrain conditions, the following offensive frontages listed in figure 4-1 could be considered as maximums.

FIRE TEAM	50m
SQUAD	100m
PLATOON (2 up, 1 back)	300m
COMPANY (2 up, 1 back)	600m
BATTALION (3 up, 1 back)	1,800m

Figure 4-1. Ideal, Maximum, Offensive Frontages (Foot-Mobile).

Obviously, the imaginative and dynamic utilization of supporting arms can strikingly influence the battalion's breadth of action covering subordinate unit gaps and flanks. Similarly, the mobility of the battalion will affect is attack frontage - i.e., the more mobile, generally the greater its attack frontage can be. In this regards, simply mobilizing the continuing reserve unit (Special Infantry Troop), for instance, with a battalion's "fair share" of amphibious assault vehicle assets (i.e., a "platoon"), can significantly broaden the attack frontage of an otherwise foot-mobile battalion.

b. Defense

In the defense, as with the offense, the combat environment (i.e., METT) will ultimately determine the breadth of the battalion frontage. The lateral disposition of "positional" units is principally predicated upon ensuring each such unit can achieve and maintain fire superiority within its respective zone of action, in order to repulse the heaviest weighted enemy attack force anticipated to maneuver within that zone. With a total of four maneuver elements available, the battalion commander

can conduct a defense on ideal terrain, with three companies forward. Increased organic weapons ranges at all levels within the battalion, allow it to reassume traditional frontages as indicated in FMFM 6-3 (pg 267), despite slightly smaller unit personnel strengths. These frontages are listed in figure 4-2.

FIRE TEAM	125m
SQUAD (2 up)	250m
PLATOON (3 up)	750m
COMPANY (2 up, 1 back)	1,500m
(in depth)	1,100m
BATTALION (3 up, 1 back)	4,500m
(in depth)	2,000m

Figure 4-2. Ideal, Maximum Defensive Frontages.

404. FORMS OF MANEUVER

The infantry battalion executes three basic forms of maneuver: the frontal attack, the penetration, and envelopment.

a. The frontal attack is characterized by a direct attack along the front of a weaker enemy or used to support a main attack conducted elsewhere. While executing a frontal attack the commander seeks to create or take advantage of conditions that will permit a more decisive penetration or envelopment of the enemy defensive positions. However, the stronger the defending threat forces in relation to the attacking forces, the less capability the commander has for changing his scheme of maneuver once committed.

b. The penetration is characterized by a powerful main attack on a narrow front, while one or more simulataneous supporting attacks on a broad front decieve and hold the enemy in place. The main attack has a preponderance of combat power and is organized in depth. The purpose of the penetration is to divide the enemy force and defeat it in detail. The "C" Series T/O battalion's capability to conduct a penetration is not diminished as it has organic assets for conducting simultaneous main and supporting attacks of the same magnitude or intensity while maintaining an uncommiteed reserve. The designation of main and supporting attacks, while maintaining maneuver unit integrity, is dependent on allocation of combat support elements and priority of fires. Initially, the main attack follow-on forces may have to be the reserve. Once the follow-on force is committed to the main attack, the supporting attack force can be redesignated the reserve. In this case it is essential that the supporting attack force not be so heavily engaged that it cannot disengage and perform the mission of the reserve.

c. The envelopment causes the enemy to fight in two or more directions by moving the main attack around enemy defensive positions to seize objectives in the enemy's rear. It is characterized by surprise, mobility, and the ability of supporting attacks and deception to hold the enemy in place. Considerations similar to those examined involving the conduct of a penetration remain valid. In those instances where the battalion is not authorized to bypass enemy forces in its zone, the battalion commander has to determine whether to require assaulting companies to clear the zone, at a risk of loss of momentum, or have the reserve company clear the zone and risk fragmenting the

reserve capability. If the commander feels these risks are too great and will influence his ability to accomplish the mission he should notify higher headquarters. More frequent bypassing of enemy forces by the assault battalions and the use of the reserve battalion to clear bypassed enemy forces will allow the battalion to maintain momentum.

d. A battalion consisting of four maneuver units can conduct a double envelopment or turning movement.

405. COMBAT FORMATIONS

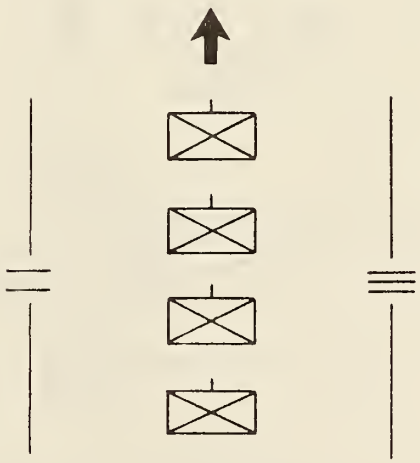
The formation to be employed by an attacking battalion is selected during the development of the scheme of maneuver and is determined by the combat environment. As stipulated in FMFM 6-3 (para. 3306, pages 187-188), the battalion utilizes two basic formations: the column and the line, or some variation thereof.

In order to support the battalion's scheme of maneuver, the commander may select from a broader range of formations with four maneuver elements than with three. Considering the fact that each subordinate level unit also has a variety of formations in which it, too, may deploy to support its own respective scheme of maneuver, the possibilities are considerable. Following are some of those from the perspective of the battalion commander viewing his companies:

a. <u>One Company in the Attack</u>. With four maneuver units, there are basically four variations wherein the battalion can form with one company "up". Generally, these formations are applicable when the enemy situation is unclear, when attacking on a quite narrow front, or when one or both flanks are exposed. NOTE: The narrowness of the

front distinguishes some of these variations from others using two or three up. Generally, this narrowness is only sufficient to allow one company the space to fully laterally deploy in its own formation. If the commander, despite this size frontage, still desires two (or more) companies "up", he will probably have to designate, in that instance, the forward company formations as well (i.e., two companies abreast, each in company column). The four variations are as follows:

(1) One Company Up, Battalion in Column. This formation (Figure 4-3) provides speed of movement for the battalion towards the objective and significant protection to exposed flanks. It minimizes forward fires in the direction of attack. Any or all of trailing companies can deploy laterally, as does the forward company, in order to close the front to rear distance of the battalion formation, although this may actually hinder subsequent maneuver.



SIT

Figure 4-3. One Company Up, Battalion in Column.

(2) One Company Up, Battalion "Diamond". This formation (Figure 4-4) can be used when the front is quite narrow and when it is anticipated that rapid movement forward of additional companies will be required to increase firepower potential or to redeploy in upcoming broader frontages within the zone of action or to protect flanks. This formation is potentially of greatest use in maneuvering towards a double envelopment where company (1) conducts the supporting attack, companies (2) and (3) the enveloping attacks and the SIT is in reserve. Generally, due to the narrow front, companies (2) and (3) will have to maneuver abreast of one another in company columns.

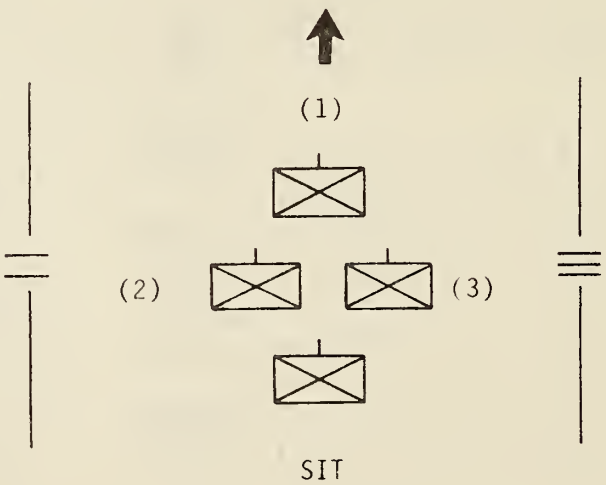


Figure 4-4. One Company Up, Battalion "Diamond".

This formation ("DIAMOND") is distinguished from the "wedge" (3 up, 1 back) in the breadth of its front and the depth of its front to rear.

(3). One Company Up, Battalion "Inverted Y". This formation (Figure 4-5), is used again when the front is narrow. It can be used when the battalion commander is maneuvering towards a single envelopment. Also, it can be used when he anticipates the need for another company's (2) firepower forward but is uncertain as to which forward flank it will be required and he simultaneously desires to retain a large reserve force (companies (3) and (SIT)). Generally, the trailing companies (3) and (SIT) will have to move abreast in company columns.

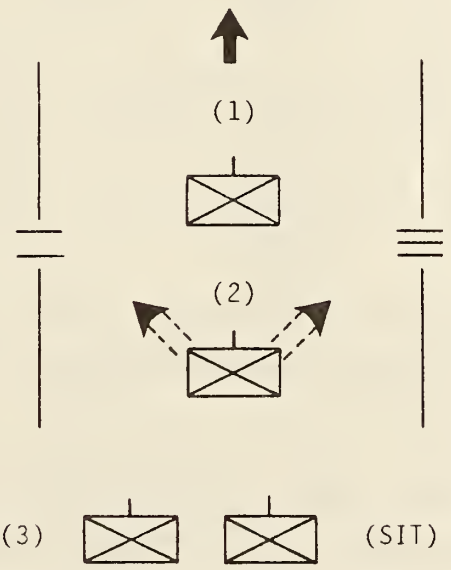


Figure 4-5. One Company Up, Battalion "Inverted Y".

(4) One Company Up, 3 Back (Battalion Inverted "T"). This formation (Figure 4-6), is used when the battalion commander is faced with a narrow frontage but anticipates he will shortly need considerable firepower forward and will possibly have to make an early committal

of his reserve. With three units abreast, it will again generally be required that they are in company columns.

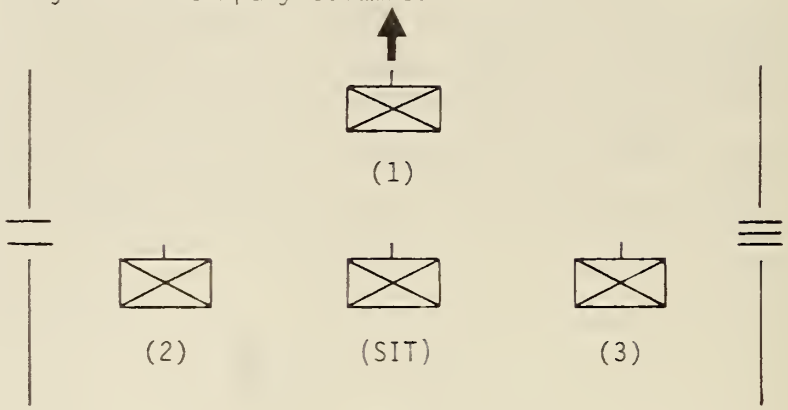


Figure 4-6. One Company Up, 3 Back, Battalion Inverted "T".

b. Two Companies in the Attack. These formations generally facilitate clearance of the zone of action and are frequently employed in a limited objective attack. They basically permit the bulk of the battalion's maneuver units' firepower to close with the enemy in a shorter period of time and may be appropriate when relatively detailed information on the enemy is available. Choice of these formations will generally occur when the battalion's frontage is such that it can deploy two companies abreast, each of which can laterally deploy in their respective, desired company formations (if desired, this size frontage could conceivably accommodate 3 up and abreast, but the battalion commander will necessarily have to order the type of company zones of action).

(1) Two Companies Up, Battalion "T". This formation (Figure 4-7) is generally used when the battalion frontage is somewhat restrictive, when it is anticipated that heavy firepower to the front is required and when the battalion flanks are relatively secure. The trailing company (3) can move in trace of either forward company in order to weight the attack or to exploit an enemy weakness by an envelopment (single). The fourth maneuver unit (SIT) is deployed in depth in a reserve role.

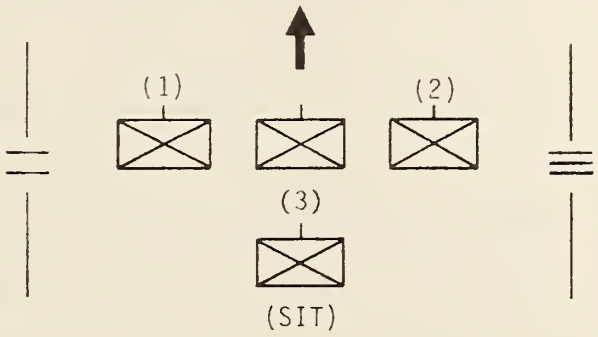


Figure 4-7. Two Companies Up, Battalion "T".

(2) Two Companies Up, Battalion "BOX". This formation (Figure 4-8) is generally used when the battalion frontage is restrictive, when it is anticipated that heavy firepower to the front is required, and when the battalion's flanks (and/or rear) are relatively insecure. The trailing rifle company (3) can be positioned on that flank thought to be most vulnerable in order to weight it.

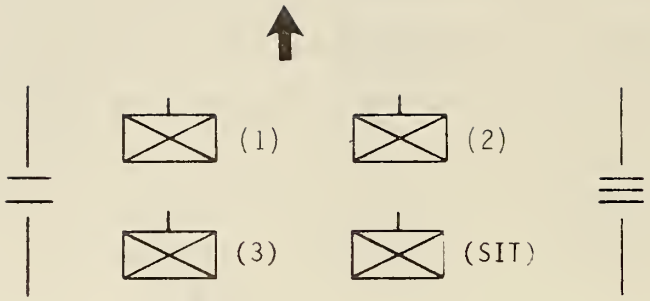


Figure 4-8. Two Companies Up, Battalion "BOX".

c. Three Companies in the Attack. The availability of a fourth maneuver element (and continuing reserve) affords the battalion commander with exceptional flexibility to orient considerable firepower weight forward when attacking with three companies up. Generally, this type formation is used when the battalion frontage is broad enough to support three companies abreast, each laterally deployed in their own respectively desired formations. Normally, in these instances the front to rear depth of the battalion is lesser than other formations as the commander is trading lateral breadth for the depth. This implies that he basically has detailed information as to the location and disposition of the enemy, he is orienting the majority of his firepower to it and he has secure flanks.

(1) Three Companies Up Battalion Y". This formation (Figure 4-9) is used when the enemy formation is known with acceptable assurance and the battalion's flanks are secure. Three companies are

deployed across the front with the middle company (3) a bit in-depth in order that it may be committed directly forward or to either flank to weight the attack or envelop the enemy. The reserve unit (SIT) is normally deployed in trace of this company until it (3) is committed.

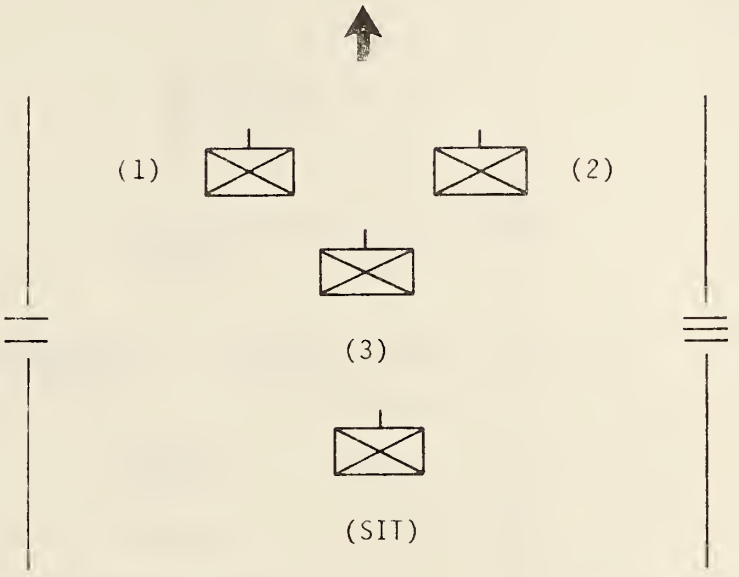


Figure 4-9. Three Companies Up, Battalion "Y"

(2) Three Companies Up, Battalion WEDGE. This formation (Figure 4-10), is generally used when the enemy formation is known with acceptable assurance but the battalion's flanks are a bit less secure (this formation allows fires to be delivered to the right front or left front by two companies vice one with the battalion "Y"). This formation differs from the DIAMOND in that the WEDGE is of significantly greater breadth and lesser front to rear depth. From this formation, the battalion commander can launch a frontal assault, a single envelopment or double envelopment as the situation develops. The fourth

maneuver element (SIT) can be positioned to best be able to support the main and/or supporting attacks.

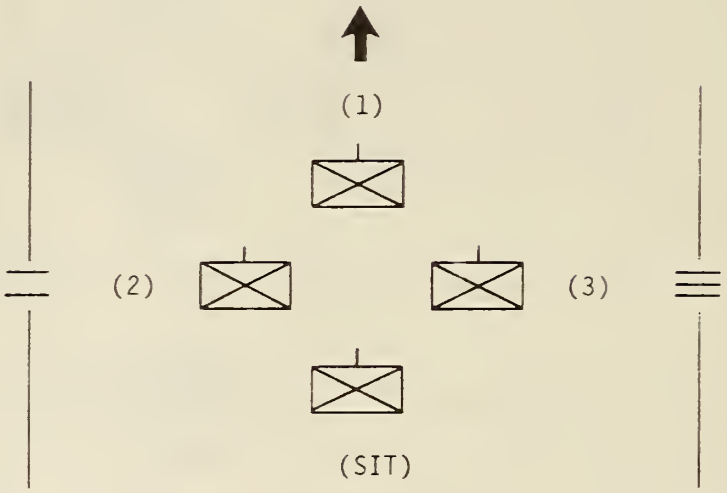


Figure 4-10. Three Companies Up, Battalion WEDGE.

(3) Three Companies Up, Battalion "T". This formation (Figure 4-11) is used when the frontage is broad, the enemy situation is known, and flanks are secure. Generally, this formation is that used for the frontal assault by the battalion, although it, too, just as the WEDGE can form the base for other forms of maneuver (envelopments).

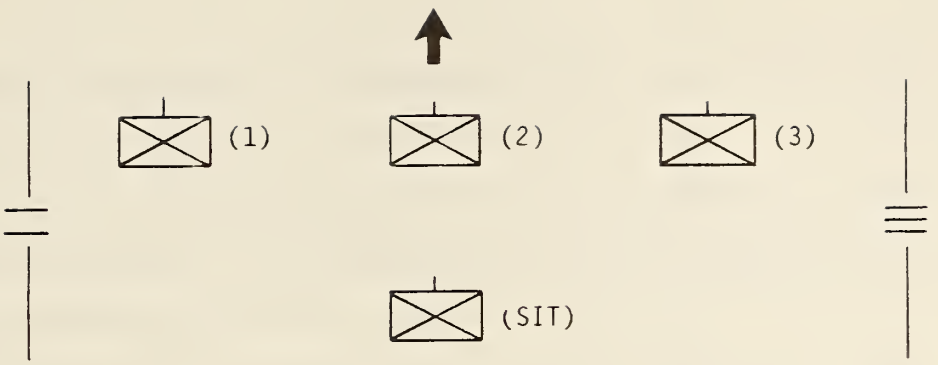


Figure 4-11. Three Companies Up, Battalion "T".

d. Four Companies in the Attack. Using four companies is considered exceptional (Figure 4-12). It may be necessary on an extremely wide front or when enemy strength on a narrow front is extraordinary. It deprives the battalion commander of all flexibility. When four companies are committed, the battalion commander plans immediately to reconstitute a reserve as early as practicable.

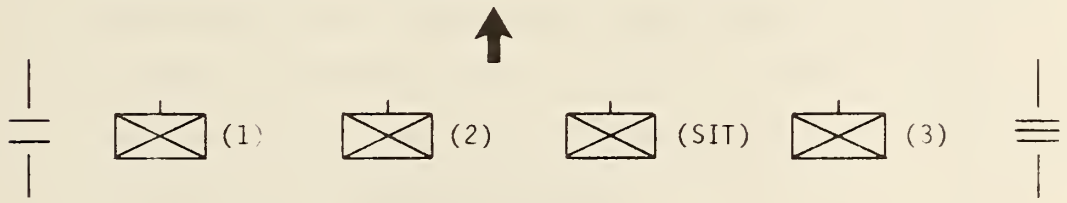


Figure 4-12. Four Companies Up, Battalion "Line".

e. Other tactical formations are potentially feasible - e.g., the battalion echelon. However, those described herein provide an array of offensive means by which a commander can close with his adversary

and from which he can launch a spectrum of offensive maneuvers (envelopments, etc.). Each is subtly different and requires severe examination vis-a-vis the actual situation as measured against METT. Coupled with the enhancements derived from a greater arsenal of organic weapons provided by the "C" Series T/O, these formations and the classical forms of maneuver available to a light infantry force, the infantry battalion is capable of extraordinary flexibility in its offensive application of combat power.

406. RESERVE IN OFFENSE

a. General. An attack by the new battalion which requires more than three companies to conduct main and supporting attacks will impact directly on the reserve. The Special Infantry Troop (SIT) of the combined arms company of the "C" Series T/O is expressly designed to lessen this impact. A strong reserve is always desireable but is of lesser importance than allocating sufficient combat power to the attacking elements. Attacking with a small reserve involves an increased risk but deliberate failure to allocate the necessary combat power to the attacking elements is tantamount to failure of the mission. Given this situation, the commander must organize his force to provide the required strength to the attacking elements and create a reserve from remaining resources. In the offense the reserve is located to facilitate its rapid movement to points of probable employment. It is positioned to favor the main attack, to provide security to the command, and to take advantage of available protection against hostile observation and fire. Its missions include:

(1) An attack to exploit an enemy weakness or friendly success.

(2) An attack from a new direction on an enemy position which, because of its strength, has halted or threatens to halt the advance of the attacking echelon.

(3) An operation against the hostile rear area to extend or exploit an envelopment, a successful penetration or conduct the pursuit phase of the exploitation.

(4) The assumption of the mission of an attacking element that has become disorganized, depleted, or for any reason has been rendered ineffective.

(5) The reduction of enemy resistance that may have been bypassed by the attacking echelon or that may subsequently develop to the rear of the attacking echelon.

(6) The protection of the battalion flanks and rear.

(7) Assistance to adjacent units when such action favors the accomplishment of the battalion or regimental mission.

(8) Exceptionally, part of the reserve may be employed to maintain contact with adjacent units.

(9) The defeating of enemy counterattacks.

b. Use of the Reserve During the Attack

(1) The reserve may be employed to participate in the envelopment of a flank, to reinforce and exploit initial success of a penetrating force, or against any point of known or suspected weakness. Passing the reserve through units that have been stopped by enemy action is avoided whenever possible; rather, the reserve should be

committed from a new direction to achieve surprise and avoid intermingling and confusion. The reserve is used to exploit success rather than to reinforce failure.

(2) The reserve should be located in a position from which it can move rapidly to points of probable employment. As the attack progresses, it moves by bounds and is kept close enough to the attacking echelon to be responsive if it must be committed.

(3) When, in the battalion commander's judgment, the situation warrants employment of the reserve, he commits it without hesitation, redesignating the least committed company as the reserve or reconstituting a new reserve as soon as possible. At times, the commander may commit only a portion of the reserve to accomplish a specific task. The battalion commander notifies the next higher commander when any portion of the reserve is committed.

(4) Initially, the battalion's continuing reserve force is vested in the Special Infantry Troop (SIT) of the combined arms company. If it is committed, personnel from the headquarters and service company and attached units may be used to form a temporary reserve. The battalion commander may also place restrictions on committing the reserve of one or more of the rifle companies. One or more rifle companies can be placed in reserve by the commander as soon as the situation permits.

c. Under any new structure the battalion commander must be deliberate in planning for the committment of his reserve. One more maneuver unit and the resulting increase of depth provides for an increased

rotation of units in order to maintain the momentum of the attack and the combat effectiveness of attacking companies. Having a continuing reserve unit available to assume a mission of an assault company affords the commander greater depth and flexibility.

(1) The positioning of the reserve is critical. Its location relative to assault companies should be such that it can provide support where necessary and still be responsive to its primary mission. It will make greater use of alternate and supplementary positions.

(2) Extensive planning is required in order to ensure effective mutual support and fire support coordination.

407. DEFENSE

a. General. The battalion will be required to assume the defense either on order or when forced by enemy action. The mission is still the paramount factor dictating the type of defense to be employed and the position or area to be defended. The gain of a maneuver unit will decrease the probability of the need to economize forces in one area in order to concentrate superior forces for decisive offensive action elsewhere. The increase of the battalion's combat endurance will decrease those instances where the battalion must assume a defensive status for brief periods in order to resupply, re-equip and reorganize.

408. DEFENSIVE FRONTAGES

a. The four-company battalion is capable of conducting a defense, on ideal terrain, with three companies forward, on frontages up to 4,500 meters and with a depth of 2,000 meters. The company, in turn, is capable of defending frontages up to 1,500 meters and 1,100 meters

in depth. These are considered to be maximum frontages and are expected to be considerably less where conditions which limit the visibility and fields of fire exist or when the terrain offers the enemy good avenues of approach. The maximum frontages of the battalion or companies have not changed with the "C" Series T/O - 4,500m and 1,500m, respectively.

b. The maximum frontage that should be assigned to the new battalion in the defense is 4,500 meters (see Figures 4-14, "C" Series T/O 4-15, 4-16). Under optimum conditions, a defensive sector of this size allows for the positioning of three companies forward and one (SIT) in reserve. Although small in personnel, it is defending a normal sector with a greater weight of combat support per rifle company.

c. Should a battalion be assigned a defensive sector greater than 4,500 meters (or less if conditions are less than optimum). Three companies in the battalion defense area will be insufficient to occupy the entire sector, inasmuch as companies are not assigned sectors greater than 1,500 meters regardless of the frontage assigned the battalion. Under these conditions the commander will be faced with a choice between allocating additional forces to the forward defense area or accepting gaps between forward deployed companies. There are advantages and disadvantages to either approach which must be carefully weighed.

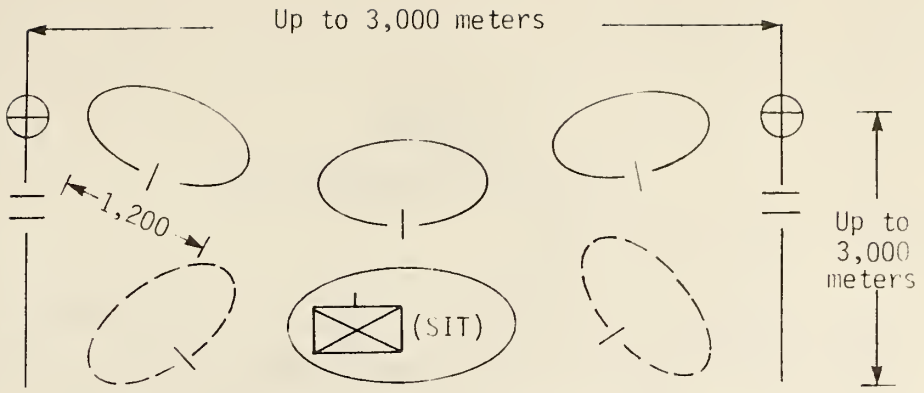


Figure 4-13. "Y" Formation.

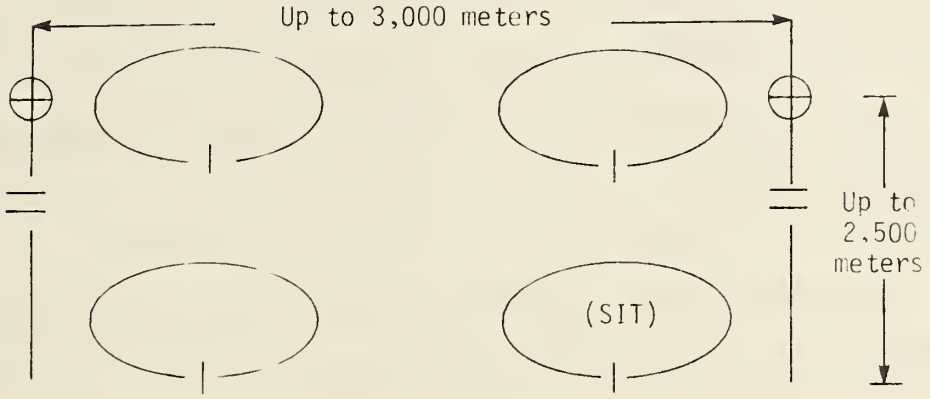


Figure 4-14. Quadrangular Formation.

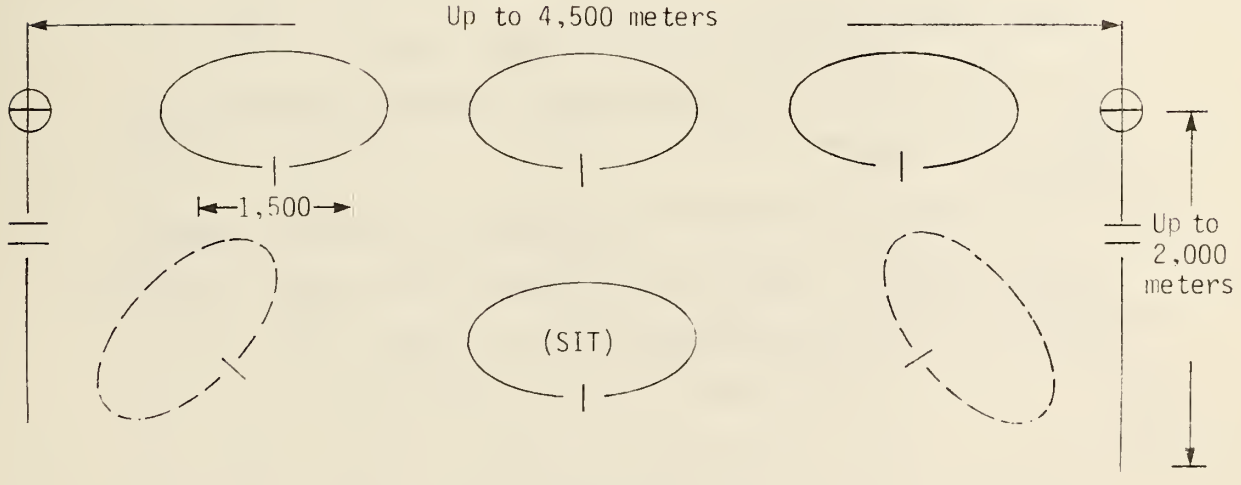


Figure 4-15. "T" Formation.

409. RESERVE IN DEFENSE

a. General. As the battalion commander is determining the forces required on the FEBA, he concurrently considers the size and location of the reserve. He allocates sufficient combat power to the reserve after a consideration of the mission, enemy situation, terrain, and combat power available. The Special Infantry Troop of the combined arms company is the battalion's continuing reserve. It may be weighted by task-organizing it with the battalion's organic (or attached) weapons systems.

410. NIGHT ATTACKS

a. Night attacks remain a viable alternative to daylight operations. They provide the battalion with the capability to:

(1) Achieve surprise.

(2) Avoid heavy losses.

(3) Compensate for inferior combat power.

(4) Complete or exploit success and to maintain pressure against the enemy.

b. Procedures set forth in paragraph 3313, FMFM 6-3, Marine Infantry Battalion, remain valid and should be reviewed in conjunction with the considerations provided by this handbook.

SECTION 5

AMPHIBIOUS/MAGTF OPERATIONS

501. GENERAL

Only in extreme circumstances will the infantry battalion be employed in non-MAGTF separate or reinforcing roles.

502. CONCEPT OF EMPLOYMENT

Task organized as a Battalion Landing Team (BLT), the infantry battalion continues to be employed as the Ground Combat Element (GCE) of the Marine Amphibious Unit (MAU) and as a component of the GCE's of larger Marine Air-Ground Task Forces. Impacts resulting from the "C" Series T/O are more readily identified at the MAU level. The requirements to provide security for any logistic or other installation established ashore will not change and the BLT now has one additional maneuver element with which to help meet these requirements initially.

503. SHIP-TO-SHORE MOVEMENT

a. MAU. With one or more companies available for the reserve, the simultaneous landing of two companies beyond mutual supporting distances is again feasible. Measures such as the pre-H-hours introduction of reconnaissance elements, preparatory fires, and simultaneous landing of forces remain as necessary components at the MAU level. An alternate organization for landing of MAU Service Support Group (MSSG) elements in a combat support role, as added security or reserve elements in emergency situations, should be incorporated in the Plan for Landing if possible, in order to gain the advantage of early movement and

tactically-oriented mission execution of all the battalion's maneuver units.

b. MAB/MAF. The infantry battalion (BLT) will require slightly more landing means but should be able to complete the ship-to-shore transit in a normal time. The increased depth of the battalion will have other impacts on the conduct of the ship-to-shore movement.

(1) Surface (Waterborne) Assault. The BLT landing by surface means classically landed with two companies abreast in the first two troop waves embarked in amphibious vehicles. Each company landed with two platoons in the first wave, followed by the remaining platoon in the second. The BLT reserve normally landed in later scheduled waves in landing craft usually following the mortar platoon and/or other supporting elements. Critical to the ship-to-shore movement is the requirement to maintain the momentum of the attack. In the event the initial assault companies are not able to achieve their initial objectives, the situation can be altered by committal of either or both remaining maneuver elements of the BLT. Otherwise, assistance from an adjacent BLT and/or commitment of the RLT reserve is required.

(2) Helicopterborne Assault. The phases for the employment of helicopterborne units outlined in paragraph 5205, FMFM 3-3, Helicopterborne Operations, seizing and establishing the landing zone and the conduct of further operations ashore, and techniques of assault remain applicable.

SECTION 6

FIRE SUPPORT

601. GENERAL

a. The "C" Series T/O structure will affect the fire support plan. This is especially true since a main thrust of the reorganization was to improve organic fire support assets. As has been previously stated the gain of a maneuver unit has resulted in a gain of some depth and flexibility for the battalion. A measure of these may be even further enhanced through more effective use of available firepower. The combat power of the battalion is influenced by maneuver and firepower. The "C" Series T/O provides enhancement of both.

b. This chapter discusses fire support under the "C" Series T/O infantry battalion organization. Reference will be made to the various aspects of fire support coordination, the functions and membership of the Fire Support Coordination Center (FSCC), and the duties of the members. The infantry battalion's organic weapons affected by the reorganization and supporting arms will also be discussed. The purpose of this chapter is to offer a consolidated discussion of fire support coordination and present alternatives for the employment of those weapons affected by the reorganization.

c. Fire support is one of the principal resources available to the commander. A key element in any tactical operation is the manner in which the infantry commander is able to plan and utilize his available supporting fires. Proper application of the fundamentals of fire

support planning and coordination is essential for maximum effectiveness in the employment of this principal resource.

602. PRINCIPLES OF FIRE SUPPORT COORDINATION

a. General. The successful coordination of fire support demands complete understanding of the basic principles of fire support coordination.

b. Principles

(1) Consider the Use of All Fire Support Available. Fire support assets may be organic, assigned, attached, or in a supporting role. Capabilities and limitation of each type of fire support must be considered, with a view toward utilizing the most effective means, consistent with responsiveness, economy, and availability.

(2) Furnish the Type of Fire Support Requested. The requesting agency is usually in the best position to determine immediate fire support requirements. For various reasons, it may not be practical to provide the type of fire support requested; however, the fire support specified in the request will serve as a basis for determining the type of fire support to be delivered.

(3) Assign Fire Missions to the Agency Capable of Delivering the Most Effective Fire. The agency capable of delivering the most effective fire must provide that fire in a timely fashion.

(4) Provide Rapid Coordination. Procedures must be established and practiced to effect rapid coordination in order to attack targets within the shortest possible time.

(5) Use the Lowest Echelon Capable of Furnishing Effective Support. Fire support is furnished by the lowest echelon that has the necessary means to accomplish the fire mission.

(6) Provide Safeguards to Friendly Troops, Vessels, Aircraft, and Installations. This is a basic tenet of fire support coordination.

(7) Use a Common System of Target Numbering. This facilitates the effective use of all fire support means.

(8) Avoid Unnecessary Duplication. Fire support resources should not be wasted by "overkilling" of targets. However, economy should not be employed to the detriment of the mission.

(9) Coordinate at all Echelons. Final coordination is accomplished at the lowest echelon able to effect coordination of the mission.

(10) Coordinate Airspace. Airspace coordination must be included in order to reduce interference between the fire support and other airspace users.

603. FIRE SUPPORT COORDINATING AND LIMITING MEASURES

Plans for the employment of fire support must be coordinated to ensure those arms are economically employed with maximum effectiveness and the requisite degree of safety. The FSCC's proper application of coordinating and limiting measures will enhance this endeavor. (Refer to FMFM 7-1, para 2301 for detailed discussion of these measures.)

604. FIRE SUPPORT COORDINATION CENTER

a. General. The application of supporting arms is the means by which the commander influences the action through firepower. The FSCC

is the organization in which are centralized the necessary communication facilities and supporting arms personnel to coordinate and plan air, artillery, and naval gunfire support. The commanders of infantry battalions, regiments, divisions, and larger units establish FSCC's.

b. Functions of the Fire Support Coordination Center. The principal function of the FSCC is to provide a means to the commander for planning, coordinating, and controlling his available fire support. The FSCC and its supporting arms representatives accomplish this function by:

(1) Developing the fire support plan for the commander based on his policies, plans, and priorities and in accordance with the scheme of maneuver or plan of defense.

(2) Providing the commander with advice and recommendations for the most effective employment of supporting arms.

(3) Resolving fire support conflicts arising during planning and execution of operations in accordance with the priorities specified by the commander.

(4) Maintaining a record of targets confronting the unit, including for each the target number, grid coordinates, classification and attack priority, source, recommended attack means, unit and type of attack, and surveillance of the attack.

(5) Disseminating warnings, airspace coordination areas, trajectory limitations information, promulgating instructions involving troop safety, and coordination of supporting fires with adjacent and higher units as required.

(6) Monitoring. The requirement to promptly attack targets of opportunity prevents forwarding immediate requests for fire through a succession of FSCC's. Such requests by a forward observer must be sent directly to his own fire direction center. These requests must be monitored by the battalion FSCC, however, so that the battalion commander can properly coordinate his supporting arms with his maneuver elements. Such monitoring will also ensure that consideration is given to augmentation of the fire and that forward observers are supervised by the responsible fire support representatives. The added emphasis on mutual support between maneuver units also requires increased emphasis on the monitoring of their fires.

c. Duties of the FSCC Members. The duties and responsibilities of the members of the fire support coordination center are peculiar to their assignments and the supporting arm with which they are associated. The membership of the FSCC can be best illustrated through the example of the FSCC at the infantry battalion level, composed of the following:

(1) Fire Support Coordinator. The combined arms company commander performs the duties of the fire support coordinator (FSC), under the cognizance of the S-3, in the "C" Series T/O battalion. As the FSC, he is responsible for the operation and organization of the FSCC to include the training of personnel in the internal functioning of the FSCC. In addition, the FSC performs the following:

(a) Develops, with the commander and his staff, the overall fire support plans to support the scheme of maneuver or plan of defense.

(b) Resolves conflicts regarding selection of targets and assignment of fire support means.

(c) Ensures that fire support plans can be implemented with the available fire support means.

(d) Assists in selection of coordination measures.

(e) Ensures the coordination of other supporting arms with air operations.

(f) Ensures the dissemination of available target information to interested staff sections.

(g) Maintains close liaison within the combat operations center to ensure the most effective planning and application of fire support.

(2) Assistant Fire Support Coordinator. The assistant fire support coordinator is normally a regular member of the FSCC and is designated by the FSC. The artillery liaison officer is a probable choice for this assignment. (See FMFM 7-1, para. 3203 for a listing of duties.)

(3) Artillery Liaison Officer. The artillery liaison officer is organic to a 105mm howitzer battery of the direct-support artillery battalion. In addition to his liaison duties listed in FMFM 7-1, paragraph 3024, he should be qualified to assume the duties as the assistant FSC and the FSC, if so designated.

(4) Air Officer. The air officer is organic to the infantry battalion. It is his duty to advise the battalion commander on air capabilities and limitations, coordinate air requests and all air support. (See FMFM 7-1, paragraph 3205, for his specific duties.)

(5) Naval Gunfire Liaison Officer. The Naval Gunfire Liaison Officer (NGLNO) is organic to the headquarters battery of the direct support artillery battalion. He directs the activities of the shore fire control party and advises the FSC on naval gunfire support. (See FMFM 7-1, para 3206, for his specific duties.)

(6) Mortar Platoon Representative. The mortar platoon representative is the platoon commander. He advises the battalion commander, the staff, and the FSCC on mortar support. He monitors fires requested by mortar forward observers and keeps the fire support coordinator informed of fires being delivered by his platoon. He is located with the mortar platoon FDC and maintains liaison with the FSCC by radio, wire, messenger, and if required, personal visit.

(7) Other Fire Support Representatives. Other fire support such as that provided by tanks, antitank, and attached AA require coordination in the overall plan of fire support. Coordination may require representation in the FSCC.

605. ORGANIC WEAPONS SUPPORT

a. General. In addition to the supporting arms of air, artillery, and naval gunfire, fires in support of the infantry battalion also include weapons organic to the combined arms and rifle companies of the infantry battalion.

b. Combined Arms Company. Fire support means organic to the weapons company include the mortar platoon, the antiarmor platoon (TOW and DRAGON), heavy machinegun section, and Special Infantry Troop. The company provides centralized training, maintenance and control of

the battalion crew-served weapons in garrison. During operations, these weapons function directly under the battalion commanders' control. The battalion commander organizes his crew-served weapons for combat by keeping them under centralized control and assigning tactical missions or by attaching them to rifle companies, or a combination of both methods.

(1) Mortar Platoon. When organizing his mortars for combat the battalion commander determines whether to decentralize their control by attaching them to rifle companies or to keep them under centralized control. When the tactical situation permits they are most effectively employed under centralized control and in support of the battalion as a whole. However, the tactical situation may require the attachment of one or more sections to the rifle companies. The existence of four 81mm mortar sections to support a four-infantry company battalion has provided the battalion commander with greater flexibility in organizing his mortars for combat. He may now attach a mortar section to each rifle company and still have one section under centralized control or to support his reserve force. He may, also, provide a section to an outpost or other independent operation and retain one mortar section per rifle company operating under centralized battalion control. All four mortar sections are capable of internal FDC computing and each has a 3-man mortar support (communications) team from the communications platoon. The combination of both 81mm and 60mm (M224 LWCMS) mortars has increased the battalion commander's mortar platoon tubes to 10. The organization of the two LWCMS sections is identical to that of the rifle company's LWCMS

sections, and hence, is readily structured for attachment while still retaining 81mm mortars at the battalion level.

(2) Antiarmor Platoon. This platoon possesses four (6-team) DRAGON sections to support four maneuver elements against medium-range antiarmor threats and four (2-team) ITOW squads to engage long-range, heavy antiarmor threats. This platoon represents a considerable increase in battalion firepower and capability to defeat a heavily armored adversary. The ITOW squads are vehicularly-mounted and hence, can be moved about the battlefield with dispatch to meet the enemy's main attack. In limited terrain or against a nonarmored threat, these personnel can be used in a variety of augmentation roles if properly cross-trained (e.g., mortars, machineguns, SIT, MSSG security, etc.).

(3) Heavy Machinegun Section. Equipped with eight M2, .50 caliber machineguns (or the Dover Devil), this section provides long-range (2,000 meter) direct fires against light-armored vehicles, personnel, and as a deliberate enemy attack/assault helicopter air defense unit. Structured with one squad for each maneuver element, it can be best utilized when vehicularly mounted. It is recommended that this same section be cross-trained in the use and maintenance of medium machineguns (M60's) in order to realize their contribution when terrain disallows the movement of the heavier .50 caliber machinegun. For this eventuality, eight M60's should be included in the combined arms company Table of Equipment (T/E). Also, the heavy machinegun section may well be equipped in the near-term (0-5 years) with the Mark 19, Mod 3 40mm automatic grenade launcher and/or in the mid-term

(5-10 years) with an air defense missile system (STINGER or STINGER POST).

(4) Special Infantry Troop. Not a true "fire support" system, its intended role is as the battalion's "continuing reserve" allowing the battalion commander to fight his battalion with three companies forward at his discretion.

c. Rifle Company. In the "C" Series T/O infantry battalion, the rifle companies T/O have a M60 machinegun section, 60mm LWCMS mortar section, and three-team DRAGON squad. These will increase the organic firepower of the company and provide the company commander an added measure of flexibility, particularly against medium-range armor.

(1) 60mm (LWCMS) Mortar Section. The 60mm mortar section in the "C" Series T/O consists of three squads with one mortar per squad. The company commander employs his mortars in the same way that the battalion commander employs his mortars, keeping them under centralized control when possible but attaching them to rifle platoons when required by the tactical situation. Company commanders operating with the LWCMS will realize a considerably enhanced lethality (comparable to the 81mm mortar) and significantly greater engagement-range capability (3,750 meters).

(2) M-60 Machinegun Section. Contains 3 M60 squads.

(3) DRAGON Squad. The "C" Series T/O for rifle companies contains a three (2-man) team squad of 1,000 meter range medium, antiarmor weapons (DRAGON). The company commander is now capable of destroying enemy armor at medium ranges, and then employing either mortars or machineguns at these same ranges to destroy disembarked enemy troops.

(4) Other. Included elsewhere in the infantry battalion's arsenal at the rifle company level will be the Squad Automatic Weapon (SAW) - one per fire team, two per squad--a specifically engineered assault weapon (against bunkers and fortification)--the SMAW (issued as a munition); and an improved infantryman's rifle (M16A2). A close-range antiarmor munition (LAAW) will continue to be available.

606. SUPPORTING ARMS

The level of fire support available and the spectrum of its capabilities is significantly greater than heretofore known. Although some systems are necessary in greater densities to meet an armored threat, the light infantry concept remains characteristic. Sufficient additional systems (M60's and rifles) will remain in the battalion's T/E to substitute for those noneffective in certain combat environments. Cross-training in order to "task weaponize" certain units within the combined arms company will still further enhance the battalion's combat power.

SECTION 7

COMBAT SERVICE SUPPORT

701. GENERAL

The "C" Series T/O infantry battalion will affect combat service support planning. Exact effects have yet to be determined as they will be based on future T/E adjustments (e.g., type of heavy machinegun--M2, .50 caliber; M240 (.50 caliber, 120mm) Dover Devil; or Mark 19, 40mm, automatic grenade launcher) and employment considerations. Nonetheless, certain broad inferences can be drawn.

702. IMPACT

To some extent, it can be presumed that Class I, III, and V materiel requirements will be greater for a "C" Series T/O than for the current structure. However, on balance, these requirements may be offsetting in comparison to the historical ("M" Series T/O) infantry battalion.

To be sure, Class I supplies will be greater for the "C" Series T/O than the current structure by about three tons and 200 cubic feet (30-day mount out). However, this is still substantially less than the historical "M" Series T/O, which required 18 tons and 1,200 cubic feet more Class I, 30-day mount out supplies, than does the current ("I" Series T/O) battalion.

Savings in Class I will undoubtedly be offset in higher Class III (POL) requirements for the "C" Series T/O which carries additional jeeps and trailers for its TOW section.

Class V (ammunition) requirements for the "C" Series T/O are probably of greatest impact. This is due to the greater array of

weapons systems inherent to it. The exact extent of this impact is not accurately measured at this time due to its dependence upon weapons system acquisition in support of the "C" Series T/O. It is most probable that the weight and cube associated with this battalion will be high, as greater fire systems are incorporated, such as the LWCMS, SAW, etc..

SECTION 8

COMMUNICATIONS

801. INTRODUCTION

a. Communication support of the Marine infantry battalion is situationally dependent. Regardless of the task organization in which the battalion finds itself involved; e.g., the ground combat element of a MAU, a portion of a MAB, or a part of a joint/combined force, the battalion communication system must support:

(1) The scheme of maneuver.

(2) The plan for supporting fires.

(3) The logistical plan.

b. Conversely, the tactical, logistic, and fire support planners must carefully coordinate the development of their plans with the communication officer to ensure that all operations are communicationally supportable.

802. COMMUNICATION CONSIDERATIONS

a. During scenarios in which the role of the infantry battalion is primarily offensive in nature, the battalion will control tactical operations by line of sight, VHF/FM radio. Properly utilized, these radios will provide the commander with the ability to rapidly transmit tactical traffic to subordinate and supporting elements. This ability, however, may be limited or constrained by terrain, distance, or enemy electronic warfare (EW) efforts. Appendix B, Radio Communications for an Infantry Regiment and Battalion Wire/Multichannel Radio, presents

an example of a battalion communication system. FMFM 10-1 provides the basic framework from which communication support may be structured to meet the requirements of any special situation.

b. In defensive operations. a different set of considerations must be addressed by planners. The communications plan should take advantage of the static nature of the defense by providing an increased use of wire within the defensive position. Wire systems that provide multi-path circuits between defensive units will limit communication disruptions incurred, due to enemy supporting arms and penetrations, while maintaining the command control necessary to relocate, to reinforce, and to exploit tactical advantages. Defensive wire systems are backed by tactical radio circuits to facilitate continuous control during the defense, and to allow an immediate transition to the offense.

c. Other considerations for effective employment of communication equipment are:

(1) Vegetation and topography can improve or impede line of sight communications. High ground will normally provide increased range capabilities in VHF tactical radios; however, it also contributes to the susceptibility to enemy electronic countermeasures (ECMs) and direction-finding. Defiles and dense vegetation are normally associated with dramatic range reductions. Thse limitations may be overcome by the use of specialized antennas; manual, automatic, and airborne retransmission; or by planning for the use of those available topographic features which maximize the range of tactical radios.

(2) Operational plans which project significant distances between battalion elements must include provisions for retransmission

sites, battalion observation posts and/or frequent displacement of the main command post.

(3) Knowledge of the enemy's electronic warfare tactics and capabilities will indicate the degree of electronic counter-countermeasures (ECCMs) to be used. Once determined, these factors will then influence the use of alternate means of communications, dictate the necessity for terrain masking, and indicate the need for specialized antennas, frequency hopping and call sign changes. Any or all of these techniques may require temporary reallocation of battalion comm-elect assets.

(4) Careful command post sites selection is implicit in good communications. The location must provide reliable communications between the command group, its subordinate units, higher headquarters, and adjacent operating forces, as well as to supporting arms and their coordinating agencies. Command post selection involves trade-offs, as the best communication site is often that with the highest vulnerability to hostile supporting arms, visual observation, and enemy EW efforts. Although radio remoting, camouflage, and terrain masking will reduce the electronic presence, the battalion commander must carefully weigh the opposing advantages and disadvantages when planning his command post locations.

(5) The doctrine of establishing communications from supporting to supported does not release the infantry battalion commander and his staff from the responsibility to ensure that adequate communications are available to guarantee continuous supporting fires and air support. Where artillery is normally requested and adjusted over VHF/FM circuits,

much of the communications for air and naval gunfire support is accomplished by high frequency (HF) radio nets. HF circuits are more susceptible to signal degradation and require a higher degree of training and support to maximize their effectiveness.

803. UTILIZATION OF COMMUNICATION ASSETS

Administrative and logistic traffic is normally transmitted over the command radio nets and teletype circuits established at the direction of the next senior headquarters. Communications between external commands, senior headquarters, and adjacent units are again situationally dependent and scenario related. Internal demands for the transmission of logistic and administrative traffic are satisfied over existing tactical radio and wire circuits. When either the tactical or logistical situation precludes their use, special purpose circuits may be established using organic battalion equipment. Normally, there are sufficient assets within the battalion to enter the radio nets directed by higher headquarters. Communication attachments from higher headquarters will be furnished to provide telephone and teletype service to other units of the MAGTF. The earliest possible attachment of supporting communication teams will significantly improve coordination and assure complete integration of these elements into the battalion communication system and support plans.

804. COMMUNICATION SECURITY

The potential enemy's extensive capability and use of electronic warfare demand that every commander give detailed attention to communication security (COMSEC) and electronic counter-countermeasures. Current inventory voice cyphony equipment provides the opportunity for

unencumbered speech on tactical VHF/FM radio circuits. There are some distinct drawbacks to the use of this equipment; the employment of these devices significantly increases the weight of the radio while decreasing its range, and logistic concerns are intensified by increased battery consumption. In situations where security is paramount, these disadvantages must be accepted and circumvented. In other situations, on multichannel voice circuits, and on high frequency nets, the EW threat may be countered through the proper employment of numeral codes, operational codes, authentication, and frequency/call sign changes.

805. FLEXIBILITY

A final concern when developing the communication plan is the designing of a system with sufficient equipment flexibility to cope with unexpected situations and ensure the expeditious replacement of equipment that inevitably becomes damaged or inoperative during combat operations.

Plans must anticipate and facilitate the uninterrupted availability of repair parts and consumable communications-related supplies, wire, and batteries. With the institution of a fourth infantry unit, the communication equipment normally allocated as with the "M" Series (4-company) T/O must again support this unit, too. Requirements for communications assets for the mortar platoon remain unchanged. The needs of the TOW section and heavy machinegun section must be accommodated and can possibly be gained, in some instances, by the centralized employment of DRAGON assets.

APPENDIX A

TABLES OF ORGANIZATION

1. GENERAL

This appendix provides Tables of Organization for the Rifle Company, Weapons Company, and Headquarters and Service Company of the "C" Series T/O.

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	F T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P N	Edu	S E P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
1	*Battalion Headquarters																							
2	* Battalion Commander		LtCol	0302	M		O		1							P								
3	* Executive Officer		Major	0302	M		O		1							P								
4	* Sergeant Major		SgtMaj	9999	M		E			1						P								
5	* Messenger/Driver		Pvt	0311	M		E			2						M								
	Section Total Marine								2	3														
6	*S-1/Adjutant Section																							
7	* S-1/Adjutant		Lt	0302	M		O		1							P								
8	* Ass't S-1/Adjutant		Wo	0170	M		O		1							P								
9	* Pers Admin Chief		GySgt	0193	M		E			1						P								
10	* Pers Chief		SSgt	0193	M		E			1						P								
11	* Ass't Pers Chief		Sgt	0121	M		E			1						M								
12	* Pers Clerk		Cpl	0121	M		E			1						M								
13	* Pers Clerk		LCpl	0121	M		E			1						M								
14	* Pers Clerk		Pvt	0121	M		E			2						M								
15	* Unit Diary Clerk		Cpl	0131	M		E			2						M								
16	* Unit Diary Clerk		LCpl	0131	M		E			2						M								
17	* Unit Diary Clerk		Pvt	0131	M		E			1						M								
18	* Admin Clerk		Sgt	0131	M		E			1						M								
19	* Admin Clerk		Cpl	0151	M		E			1						M								
20	* Admin Clerk		Pvt	0151	M		E			1						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.		English Description	Bill Spon	Alpha Grade	MOS	T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P N	Edu	S E P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
21	*	Legal Services Man		Cpl	4421		M	E			1						M								
22	*	Legal Services Man		Pvt	4421		M	E			1						M								
			Section Total Marine							2	17														
23	*	S-2 Section																							
24	*	S-2		Capt	0202		M	O		1							P								
25	*	Intell Chief		GySgt	0231		M	E			1						P								
26	*	Intell Asst		Sgt	0231		M	E			1						M								
27	*	Intell Asst/Driver		Pvt	0311		M	E			1						M								
			Section Total Marine							1	3														
28	*	S-3 Section																							
29	*	S-3		Maj	0302	B	M	O		1							P								
30	*	Asst S-3		Capt	0302		M	O		1							P								
31	*	Liaison Officer		Lt	0302		M	O		2							P								
32	*	Asst S-3/Air Officer		Capt	7207		M	N		1							P								
33	*	Asst S-3/FAC		Lt	7207		M	N		2							P								
34	*	Infantry Opns Chief		MSgt	0369		M	E			1						P								
35	*	Infantry Opns Asst		SSgt	0369		M	E			1						P								
36	*	NBC Officer		Lt	9910	Z	M	O		1							P								
37	*	NBC Specialist		Sgt	5711		M	E			1						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.		English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	JPN	EDU	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
38	*	NBC Specialist		Cpl	5711		M	E			1						M								
39	*	Topographic Draftsman		LCpl	1431		M	E			1						M								
40	*	Admin Clerk		LCpl	0151		M	F			1						M								
41	*	Messenger/Driver		Pvt	0311		M	F			1						M								
			Section Total Marine							8	7														
42		*S-4 Section																							
43	*	S-4		Capt	0402		M	O		1							P								
44	*	Maint Management Off		Lt	0402		M	O		1							P								
45	*	Maint Management Chief		SSgt	0441		M	E			1						P								
46	*	Embarkation Officer		Lt	0430	Z	M	O		1							P								
47	*	Embarkation Asst		Sgt	0431		M	E			1						M								
48	*	Ammunition Tech		Cpl	2311		M	E			1						M								
49	*	Log Data Cont Clerk		LCpl	0441		M	E			1						M								
			Section Total Marine							3	4														
50		*Company Headquarters																							
51	*	Company Commander		Capt	0302		M	O		1							P								
52	*	Executive Officer		Lt	0302		M	O		1							P								
53	*	First Sergeant		1st Sgt	9999		M	E			1														
54	*	Gunnery Sergeant		GySgt	0369		M	E			1						P								
			Section Total Marine																						

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
55	*Communications Platoon																							
56	* Platoon Headquarters																							
57	* Plt Cmdr/ Bn Comm Officer		Capt	2502	M	O			1							P								
58	* Communications Chief		MSgt	2531	M	E				1						P								
59	* Radio Tech		SSgt	2861	M	E				1						P								
60	* Radio Tech		Sgt	2861	M	E				1						M								
61	* GND Radar Rprman		Sgt	2804	M	E				1						M								
62	* Radio Rprman		Cpl	2841	M	E				1						M								
63	* Telephone-Teletype Tech		Cpl	2811	M	E				1						M								
64	* Teletype Tech		Cpl	2818	M	E				1						M								
65	*Message Center Section																							
66	* Message Center Section		SSgt	2549	M	E				1						P								
67	* Message Center Man		Cpl	2542	M	E				1						M								
68	* Message Center Man/Drvr		LCpl	2542	M	E				1						M								
69	* Message Center Man/Drvr		Pvt	2542	M	E				1						M								
70	* Teletype Operator		Cpl	2542	M	E				1						M								
71	* Teletype Operator/Drvr		Pvt	2542	M	E				1						M								
72	*Wire Section																							
73	* Wire Chief		Sgt	2512	M	E				1						M								
74	* Wire Supervisor		Cpl	2512	M	E				1						M								
75	* Wireman		LCpl	2512	M	E				2						M								
76	* Wireman		Pvt	2512	M	E				3						M								
77	* Wireman/Drvr		Pvt	2512	M	E				1						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	F/Mn	SEP	SSC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
78	*Radio Section																							
79	* Radio Chief		SSgt	2537		M	E			1						P								
80	* Radio Supervisor		Sgt	2531		M	E			1						M								
81	* Field Radio Opr		Cpl	2531		M	E			3						P								
82	* Field Radio Opr		LCpl	2531		M	E			4						P								
83	* Field Radio Opr		Pvt	2531		M	E			5						P								
84	* Field Radio Opr/Orvr		Pvt	2531		M	E			1						M								
85	*Tact Air Cntl Pty Section																							
86	* Air Liaison Party																							
87	* Field Radio Opr		Cpl	2531		M	E			1						M								
88	* Field Radio Opr		LCpl	2531		M	E			1						P								
89	* Field Radio Opr		Pvt	2531		M	E			2						M								
90	*Fwd Air Cntl Pty/2 Each/									2 Each														
91	* Field Radio Opr		Cpl	2531		M	E			1						M								
92	* Field Radio Opr		Pvt	2531		M	E			2						P								
93	* Field Radio Opr		Pvt	2531		M	E			1						M								
94	*Mortar Support Section																							
95	* Mortar Liaison Party/1 Each/									1 Each														
96	* Field Radio Opr		Cpl	2531		M	E			1						P								
97	* Wireman		LCpl	2512		M	E			1						M								
98	* Field Radio Opr		Pvt	2531		M	E			1						P								
99	*Mortar Team									4 Each														
100	* Field Radio Opr		LCpl	2531		M	E			1						P								
101	* Field Radio Opr		Pvt	2531		M	E			1						P								
[illegible]	* Wireman		Pvt	2512		M	E			1						M								
	Section Total Marine									1 63														

T/O 1037C H&S Co Inf Bn Inf Regt

T/O 10370 H&S Co Inf Bn Inf Regt

T/I No T/MRCA

Seq No	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	SAT	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	EP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
	*Service Platoon																							
4	* Platoon Headquarters																							
005	* Plt Cmdr/Bn Sup Off		Lt	3002	M	O			1							P								
010	* Supply Chief		SSgt	3043	M	E				1						P								
	* Supply [illegible]		Sgt	3043	M	E				1						M								
	*Supply Section																							
030	* Chief Warehouseman		Sgt	3051	M	E				1						M								
040	* Supply [illegible]		Cpl	3043	M	E				1						M								
	[illegible] Warehouseman		Cpl	3051	M	E				1						M								
060	* Supply Admin Man		LCpl	3043	M	E				1						M								
113	* Gen Warehouseman		LCpl	3051	M	E				1						M								
114	* Supply Admin Man		Pvt	3043	M	E				1						M								
116	*Armorer Section																							
[illegible]	* Inf Wpn Rprman		Sgt	2111	M	E				1						M								
117	* Inf Wpn Rprman		Cpl	2111	M	E				1						M								
118	* Inf Wpn Rprman		LCpl	2111	M	E				1						M								
	*Transport Section																							
120	* Mt Section Chief		GySgt	3529	M	E				1						P								
121	* Auto Mech		Sgt	3521	M	E				1						M								
122	* Auto Mech		Cpl	3521	M	E				1						M								
[illegible]	* MV Operator		Cpl	3535	M	E				1						M								
143	* Auto Mech		LCpl	3521	M	E				2						M								
[illegible]	* MV Operator		LCpl	3535	M	E				4						M								

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
126	* MV Operator		Pvt	3535		M	E			8						M								
127	* Auto Mech		Pvt	3521		M	E			1						M								
128	*Dining Facility Section																							
129	* Dining Facility Chief		GySgt	3381		M	E			1						P								
130	* Cook		SSgt	3371		M	E			1						P								
131	* Cook		Sgt	3371		M	E			2						M								
132	* Cook		Cpl	3371		M	E			2						M								
133	* Baker		Sgt	3311		M	E			1						M								
134	* Cook		LCpl	3371		M	E			5						M								
135	* Baker		LCpl	3311		M	E			1						M								
136	* Cook		Pvt	3371		M	E			3						M								
		Section Total Marine							1	46														
137	*Surv/Target Acq Platoon																							
138	* Platoon Headquarters																							
139	* Plt Sgt/Radar Sect Ldr		SSgt	0369		M	E			1						P								
140	* Radar Section																							
141	* Radar Teams/2 Each/									2 Each														
142	* Team Leader		Sgt	0311		M	E			1						M								
143	* Radar Operator		LCpl	0311		M	E			1						M								
144	* NOD Team/4 Each/									4 Each														
145	* NOD Operator		Cpl	0311		M	E			1						M								
		Section Total Marine								9														

[illegible] 7C H&S Co Inf Bn Inf Regt

T [illegible] T/MPCA

		Billet Span	Alpha Grade	MOS	E P T T R Y T N N P A	Marines Off Enl	Other Services Off Enl	Cont F/A Off Enl Civ	P N	Edu	E P	S C	Lng	Serv Sch	T/MPCA	Eff Date	Add Del
[illegible] Chaplain section																	
1[illegible] *	Chaplain		Lt	4100	N O		1		U								
	Section Total																
	Marine																
	Navy						1										
1[illegible] Medical Platoon																	
[illegible]																	
[illegible] *	[illegible] Surgeon		Lt	[illegible]	[illegible]		[illegible]		P								
[illegible] *	Medical Chief		Hmc	8404	N E			1	P								
[illegible] *	Bn Corpsman		Hm1	8404	N E			1	P								
1[illegible] *	Environ San Tech		Hm1	8432	N E			1	P								
[illegible] *	[illegible] Man		Hm1	8404	N E			1	P								
[illegible] *	Bn Corpsman		Hm2	8404	N E			2	-								
1[illegible] *	Bn Corpsman		Hm3	8404	N E			3	P								
[illegible] *	Bn Corpsman		Hn	8404	N E			2	P								
1[illegible] Bn Aid Sta 2d Echelon																	
159 *	Asst Bn Surgeon		Lt	2100	N O		1		P								
[illegible] *	Asst Medical Chief		Hmc	8404	N E			1	P								
[illegible] *	Bn Corpsman		Hm1	8404	N E			1	P								
1[illegible] *	Admin/Supply Man		Hm1	8404	N E			1	P								
1[illegible] *	Bn Corpsman		Hm2	8404	N E			2	P								
164 *	Bn Corpsman		Hm3	8404	N E			4	P								
1[illegible] *	Bn Corpsman		Hn	8404	N E			1	P								

[illegible] 7C H&S Co Inf Bn Inf Regt

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	SSTA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P Y	Edu	SEP	SSC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
166	*Company Med Teams/4 Each/										4	Each												
167	* Company Corpsman		Hm2	8404	N	E					1					P								
168	* Platoon Corpsman		Hm3	8404	N	E					4					P								
169	* Platoon Corpsman		Hn	8404	N	E					6					P								
		Section Total																						
		Navy									2	65												
		Organizational Totals																						
		Marine																						
		Chargeable																						
		Naval Aviator							3															
		Other							17	154														
		Total							20	154														
		Navy																						
		Chargeable									3	65												

Footnote Section

166 * B 01 - Additional Duty as As S-5
166 * Z 01 - Secondary MOS 5702 desirable

169 * Z 01 - Secondary MOS 3502 desirable

T/O 1037C H&S Co Inf Bn Inf Regt

T/O 1037C H&S Co Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	S C	Leg	Serv Seh	T/MRCA	Eff Date	Add Del

Individual Weapons

Pistol	Revolver	Rifle	Ar	SMG	Unarmed	Revolver S.N.
132		109			1	

Ln No To Ln No	PEN	MCC
	_____	_____
	_____	_____
	_____	_____
	_____	_____

A-11 (XII-86)

T/O [illegible] H&S Co Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Naval Aviators																				
1	7207						1	2												3
	Total						1	2												3
Marine Officers																				
2	0170		1						1											1
3	0202						1													1
4	0302				1	2	2	4												9
5	0402						1	1												2
6	0430							1												1
7	2502						1													1
8	3002							1												1
9	9911							1												1
	Total				1	2	5	8	1											17
	Total				1	2	6	10	1											20
Marine Enlisted																				
10	0121					1	1	1	2											5
11	0131						2	2	1											5
12	0151					1	1	1	1											4
13	0193			1	1															2
14	0231			1		1														2
15	0311					2	4	2	4											12
16	0369		1	1	2															4
17	0411					1														1
18	0441				1			1												2
19	1431							1												1
20	2111					1	1	1												3
21	2511						1													1
22	2512					1	1	3	8											13

T/O 1013C H&S Co Inf Bn Int Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
23	2531					1	7	9	19											36
24	2537				1															1
25	2542						2	1	2											5
26	[illegible]				1															1
27	2591		1																	1
28	2811						1													1
29	2816						1													1
30	2841						1													1
31	2861				1	1														2
32	2884					1														1
33	3043				1	1	1	1	1											5
34	3051					1	1	1												3
35	3311					1		1												2
36	3371				1	2	2	5	3											13
37	3381			1																1
38	3521					1	1	2	1											5
39	3529			1																1
40	3535						1	4	8											13
41	4421						1		1											2
42	5711					1	1													2
43	9999	1	1																	2
	Total	1	3	5	9	18	31	36	51											154
Naval Officers																				
44	2100						2													2
45	4100						1													1
	Total						3													3

T/O 10130 H&S Co Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Naval Enlisted																				
46	8404			2	4	8	23	27												64
47	8432				1															1
	Total			2	5	8	23	27												65

Grade Average Marine Officer 2.60
Grade Average Marine Enlisted 3.54
Grade Average Civilian

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/I No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SSC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
1	*Company Headquarters																							
2	* Company Commander		Capt	0302		M	O		1							P								
3	* Executive Officer		Capt	0302	B	M	O		1							P								
4	* Communication Officer		Lt	0302		M	O		1							P								
5	* First Sergeant		1stSgt	9999		M	E			1						P								
6	* Operations Chief		MSgt	0369		M	E			1						P								
7	* Supply Sergeant		Sgt	0311		M	E			1						M								
8	* Admin Clerk		LCpl	0151		M	E			1						M								
9	* Messenger/Driver		Pvt	0311		M	E			2						M								
		Section Total Marine							3	6														
10	*Mortar Platoon																							
11	* Platoon Headquarters																							
12	* Platoon Commander		Lt	0302		M	O		1							P								
13	* Plt Sgt/Opns Chief		GySgt	0848		M	E			1						P								
14	* Ammo Tech		Cpl	2311		M	E			1						M								
15	*81mm Mortar Section/2 Each/									2 Each														
16	* Section Leader		SSgt	0369		M	E			1						P								
17	* Ammo NCO		Cpl	0341		M	E			1						M								
18	* Ammo Man/Driver		LCpl	0341		M	E			2						M								
19	* Fwd Observer		Sgt	0341		M	E			1						M								
20	*81mm Mortar Squad/2 Each/									2 Each														
21	* Squad Leader		Cpl	0341		M	E			1						M								

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA

Line No.	English Description	Bill Spon	Alpha Grade	MOS	F T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P N	Edu	S F P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
22 *	Gunner		LCpl	0341		M	E			1						M								
23 *	Asst Gunner		LCpl	0341		M	E			1						M								
24 *	Ammo Man		Pvt	0341		M	E			1						M								
25 *	Ammo Man/Driver		Pvt	0341		M	E			1						M								
26 *	LWCMS Section/2 Each/									2 Each														
27 *	Section Leader		Sgt	0341		M	E			1						M								
28 *	LWCMS Squad/3 Each/									3 Each														
29 *	Squad Leader/Gunner		Cpl	0341		M	E			1						M								
30 *	Ass't Gunner		LCpl	0341		M	E			1						M								
31 *	Ammo Man		Pvt	0341		M	E			1						M								
		Section Total Marine							1	52														
32 *	Antiarmor Platoon																							
33 *	Platoon Headquarters																							
34 *	Platoon Commander		Lt	0302		M	O		1							P								
35 *	Platoon Sergeant		GySgt	0369		M	E			1						P								
36 *	Messenger/Driver		Pvt	0311		M	E			1						M								
		Section Total Marine							1	2														
37 *	DRAGON Section/4 Each/									4 Each														
38 *	Section Leader		SSgt	0369		M	E			1						P								

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MPCA	Eff Date	Add Del
	[illegible] Team/6 Each/									6 Each														
40 *	DRAGON Gunner		Cpl	0352	M	E				1						M								
41 *	Asst Gunner		Pvt	0352	M	E				1						M								
42 *																								
	Section Total Marine									52														
43 *	TOW Section																							
44 *	Section Leader		SSgt	0369	M	E				1						P								
45 *	TOW Technician		Sgt	2875	M	E				1						M								
46 *	TOW Squad/4 Each/									4 Each														
47 *	Squad Leader		Sgt	0352	M	E				1						M								
48 *	Gunner		Cpl	0352	M	E				2						M								
49 *	Asst Gunner/Driver		Pvt	0352	M	E				2						M								
	Section Total Marine									22														
50 *	Heavy Machinegun Section																							
51 *	Section Headquarters																							
52 *	Section Leader		GySgt	0369	M	E				1						P								
53 *	Messenger/Driver		LCpl	0331	M	E				1						M								
54 *	Ammo Man/Driver		Pvt	0331	M	E				1						M								
55 *	Heavy Machinegun Squad/4 Each/									4 Each														
56 *	Squad Leader/Gunner		Cpl	0331	M	E				1						M								
57 *	Gunner		LCpl	0331	M	E				1						M								
58 *	Asst Gunner/Driver		Pvt	0331	M	E				2						M								
	Section Total Marine									19														

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
59	*Special Infantry Troo																							
60	* Headquarters																							
61	***																							
62	* Executive Officer		Lt	0302		M	O		1							P								
63	* First Sergeant		1stSgt	9999		M	E			1						P								
64	* Gunnery Sergeant		GySgt	0369		M	E			1						P								
65	* Messenger/Scout		Pvt	0311	Z	M	E			2						M								
		Section Total																						
		Marine							1	4														
66	*Rifle Platoon/3 Each/									3 Each														
67	* Platoon Headquarters																							
68	* Platoon Commander		Lt	0302		M	O		1							P								
69	* Platoon Sergeant		SSgt	0369		M	E			1						P								
70	* Messenger		Pvt	0311		M	E			1						M								
71	* Rifle Squads/3 Each/									3 Each														
72	* Squad Leader		Sgt	0311		M	E			1						M								
73	* Fire Team/2 Each/									2 Each														
74	* Fire Team Leader		Cpl	0311		M	E			1						M								
75	* Automatic Rifleman		LCpl	0311		M	E			1						A								
76	* Grenadier Rifleman		LCpl	0311	Z	M	E			1						M								
77	* Assault Rifleman		Pvt	0311	Z	M	E			1						M								
78	* Rifleman		Pvt	0311		M	E			1						M								
		Section Total																						
		Marine							1	35														
		Organization Totals																						
		Marine																						
		Chargeable							9	262														

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/O 1013C Combined Arms Company Inf Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Marine Officers																				
1	0302						2	7												9
	Total						2	7												9
Marine Enlisted																				
2	0151							1												1
3	0311					10	18	36	44											108
4	0331						4	5	9											18
5	0341					4	12	18	14											48
6	0352					4	32		32											68
7	0369		1	3	10															14
8	0848			1																1
9	2311						1													1
10	2875					1														1
11	9999		2																	2
	Total		3	4	10	19	67	60	99											262

Grade Average Marine Officer 2.22
Grade Average Marine Enlisted 3.26
Grade Average Civilian

T/O 1037C Combined Arms Company Inf Bn Inf Regt

T/O [illegible] Rifle Company Inf Bn Inf Regt

T/O [illegible] T/MRCA _____

Ln No	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WPN	Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
1	*Company Headquarters																							
2	* Company Commander		Capt	0302		M	O		1							P								
3	* Executive Officer		Lt	0302		M	O		1							P								
4	* First Sergeant		1stSgt	9999		M	E			1						P								
5	* Gunnery Sergeant		GySgt	0369		M	E			1						P								
6	* Admin Clerk		LCpl	0151		M	E			1						M								
7	* Messenger/Scout		Pvt	0311	Z	M	E			2						M								
	\ Section Total Marine								2	5														
8	*Weapons Platoon																							
9	* Platoon Headquarters																							
10	* Platoon Commander		Lt	0302		M	O		1							P								
11	* Platoon Sergeant		GySgt	0369		M	E			1						P								
12	* Messenger		Pvt	0311		M	E			1						M								
13	*Machinegun Section																							
14	* Section Leader		SSgt	0369		M	E			1						P								
15	* Machinegun Squad/3 Each/									3 Each														
16	* Squad Leader		Sgt	0331		M	E			1						M								
17	* Machinegun Team/2 Each/									2 Each														
18	* Machinegun Team Leader		Cpl	0331		M	E			1						M								
19	* Gunner		LCpl	0331		M	E			1						P								
20	* Ammo Man		Pvt	0331		M	E			1						M								
21	*LWCMS Mortar Section																							
22	* Section Leader		Sgt	0341		M	E			1						M								
23	* LWCMS Mortar Squad/3 Each/									3 Each														

T/O 1037C Rifle Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	FTN	BRN	TYP	STA	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	WP M	WP Edu	SEP	SC	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
24 *	Squad Leader/Gunner		Cpl	0341		M	E			1						P								
25 *	Asst Gunner		LCpl	0341		M	E			1						P								
26 *	Ammo Man		Pvt	0341		M	E			1						M								
27 *	Antiarmor Squad								3	Each														
28 *	Squad Leader		Sgt	0352		M	E			1						M								
29 *	Antiarmor Team/3 Each/								3	Each														
30 *	Gunner		Cpl	0352		M	E			1						M								
31 *	Asst Gunner		Pvt	0352		M	E			1						M								
		Section Total																						
		Marine							1	41														
32 *	Rifle Platoon/3 Each/								3	Each														
33 *	Platoon Headquarters																							
34 *	Platoon Commander		Lt	0302		M	E		1							P								
35 *	Platoon Sergeant		SSgt	0369		M	E			1						P								
36 *	Messenger		Pvt	0311		M	E			1						M								
37 *	Rifle Squads/3 Each/								2	Each														
38 *	Squad Leader		Sgt	0311		M	E			1						M								
39 *	Fire Teams/2 Each/								2	Each														
40 *	Fire Team Leader		Cpl	0311		M	E			1						M								
41 *	Automatic Rifleman		LCpl	0311		M	E			1						A								
42 *	Grenadier Rifleman		LCpl	0311	Z	M	E			1						M								
43 *	Assault Rifleman		Pvt	0311	Z	M	E			1						M								
44 *	Rifleman		Pvt	0311		M	E			1						M								
		Section Total																						
		Marine							1	35														
		Organization Totals																						
		Marine																						
		Chargeable							6	151														

T/O 1037C Rifle Company Inf Bn Inf Regt

T O 1037C Rifle Company Inf Bn Inf Regt

T/E No T/MRCA _____

Line No.	English Description	Bill Spon	Alpha Grade	MOS	F T N	B R N	T Y P	S T A	Marines Off	Marines Enl	Other Services Off	Other Services Enl	Cont F/A Off	Cont F/A Enl	Cont F/A Civ	W P N	Edu	S E P	S C	Lng	Serv Sch	T/MRCA	Eff Date	Add Del
Footnote Section																								
7 * Z 01				Add DU MOS 8541																				
43 * Z 01 -	Armed with M203																							
44 * Z 01 -	Armed with M203																							

Individual Weapons

Pistol	Revolver	Rifle	AR	SMG	Unarmed Revolver S.N.
25		114	18		

A-22 (XII-97)

T/O 1013C Rifle Company In Bn Inf Regt

Line No.	MOS	E9 GS18	Gen E8 GS17	Col E7 GS16	LtCol E6 GS15	Maj E5 GS14	Capt E4 GS13	Lt E3 GS12	WO E2/1 GS11	GS10	GS9	GS8	GS7	GS6	GS5	GS4	GS3	GS2 UNGR	GS1 Exc	Line Total
Marine Officers																				
1	0302						1	5												6
	Total						1	5												6
Marine Enlisted																				
2	0151							1												1
3	0311					9	18	36	42											105
4	0331					3	6	6												[illegible]
5	0341					1	3	3	3											10
6	0352					1	3		3											7
7	0369			2	4															6
8	9999		1																	1
	Total		1	2	4	14	30	46	54											151

Grade Average Marine Officer 2.17
Grade Average Marine Enlisted 3.19
Grade Average Civilian

APPENDIX B

IMPLEMENTATION PLAN

1. GENERAL

Reorganization of the infantry battalion from the "I" Series T/O to the "C" Series T/O possesses potential for significant turmoil. In this regards, the MCDEC study recommending the "C" Series T/O included a detailed, three-phase implementation plan. This detailed plan will be promulgated by HQMC prior to each phase.

The natural tendency in these matters is to expedite the occurrence. However, a more orderly, gradual transition will substantially lessen the turbulence and turmoil generally associated with organizational developmental change of depth. Additionally, sufficient lead time must be incorporated in this instance to properly initiate necessary budgetary programming to acquire the revised assets (men and materiel) associated with the "C" Series T/O. Lastly, such a "time phased" implementation will also provide the opportunity to properly develop (or revise) and publish those doctrinal materials (FMFMs, operational handbooks, etc.) which should preface these changes.

The remainder of this chapter is presented as schematics and graphics showing "how" the "C" Series T/O is evolved. This broad implementation plan calls for three phases:

- Phase I - FY 81
- Phase II - FY 82/83
- Phase III - FY 84/85

Each phase incorporates those changes which can be affected according to current POM budgeting information and known developmental cycle information (LWCMS, etc.). An overview of each phase follows:

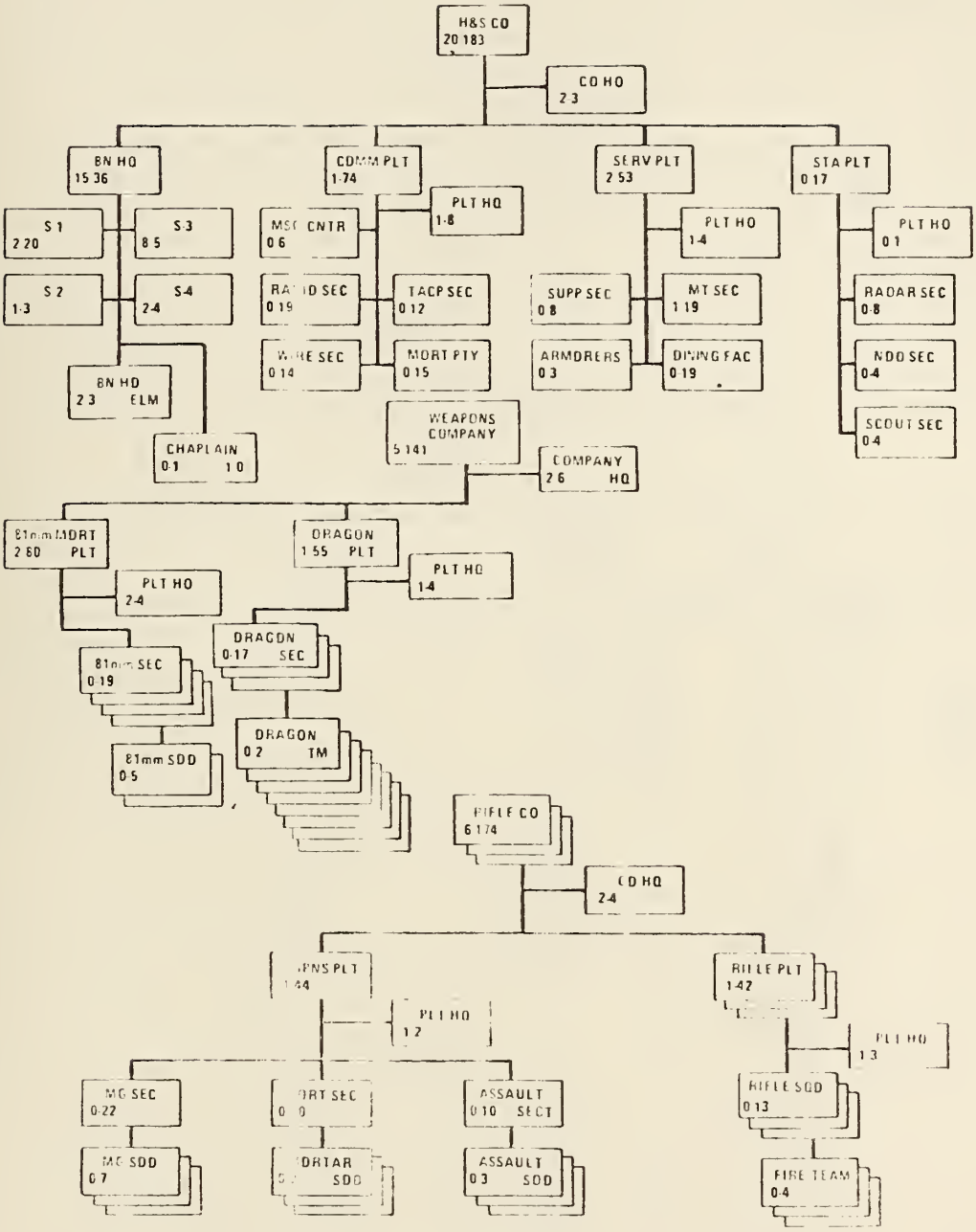
Phase I--those changes which can be affected within the next year and which require little or no additional resources.

Phase II--those changes which provide for all characteristic units of structure "C" that can be formed using a total USMC strength of 889; this phase does not require any additional personnel spaces, but does require delivery of the XM224 LWCMS to the battalions in order to initiate remaining "action" steps; for this reason, this phase is broadened to include FY 83 (as well as FY 82).

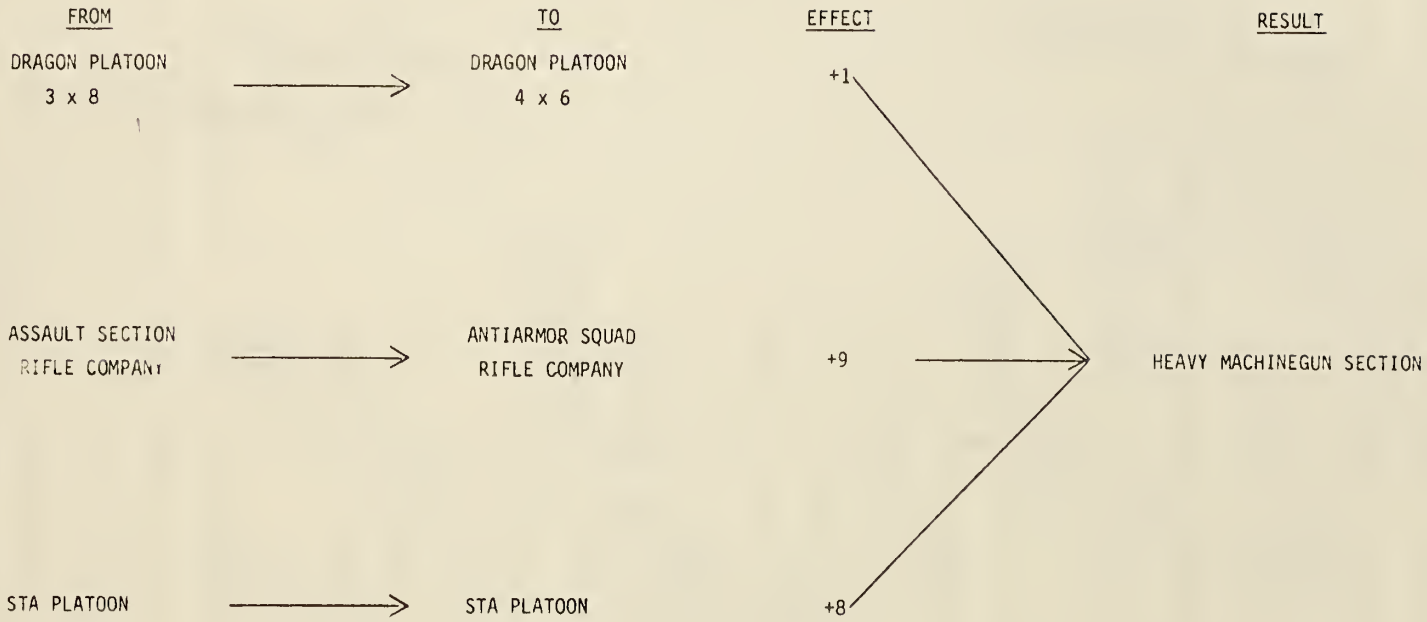
Phase III--those changes which will complete the total transition to structure "C"; this phase requires 27 additional personnel spaces for the battalion and acquisition of TOW equipment in order to be affected; hence, this phase has been scheduled last (FY 84/85) and with sufficient lead time to program, budget and acquire these resources.

The first set of seven schematics which follows embellishes this overview. Each phase is depicted with its primary action steps, their effects and results, followed by a total battalion wire diagram indicating the exact structure of the battalion (the first wire diagram is one of the startpoint - "I" Series T/O).

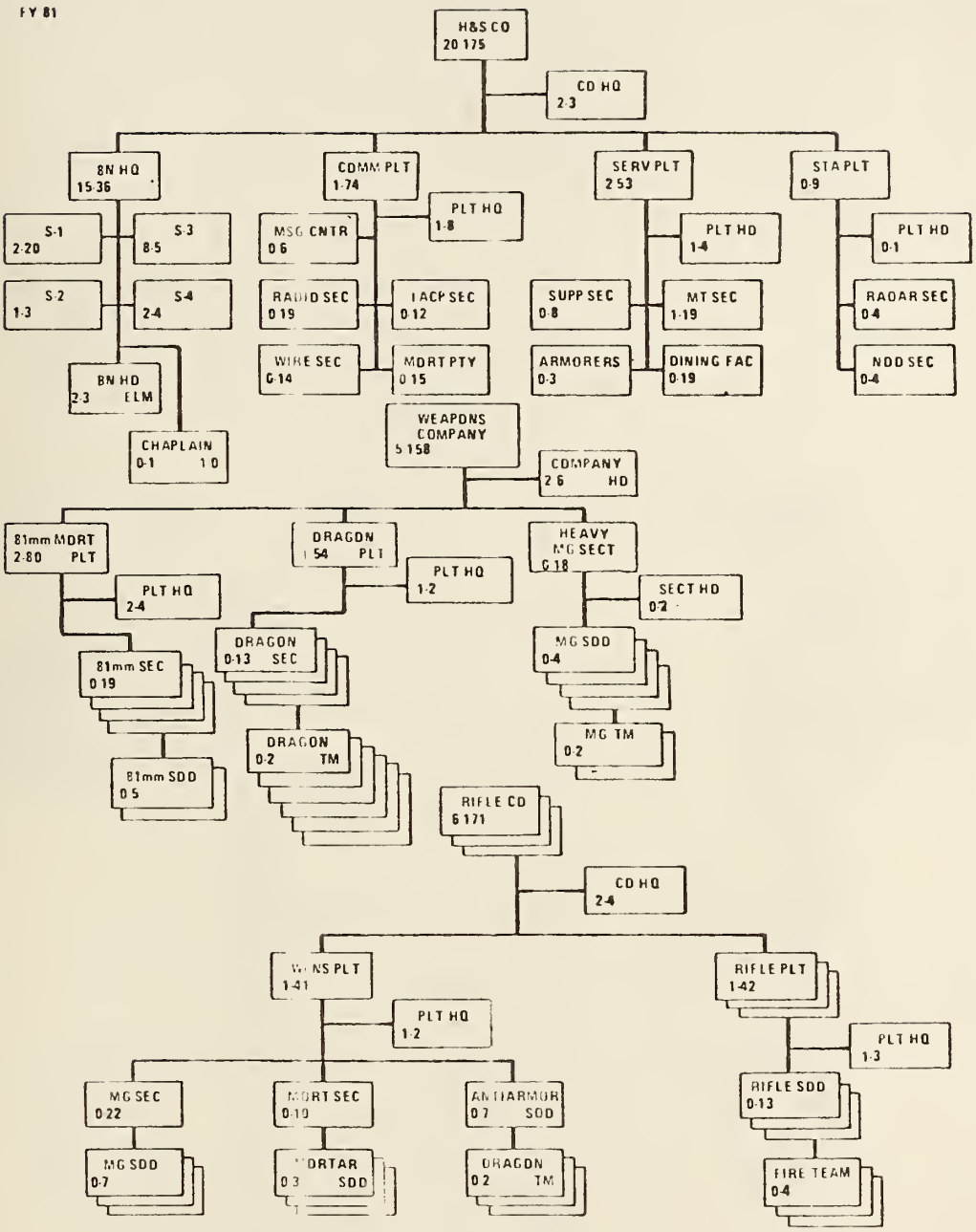
A final note is highlighted. Phase II is evidently the primary transitory phase, requiring the greatest number of steps. It should be borne in mind, however, that this step will not be undertaken until FY 82/83. This allows sufficient time to properly convey to all affected commands the precise transition and will, hence, substantially reduce turmoil while concomitantly building acceptance.


H&S CO
20 183
CO HQ
2 3
BN HQ
15 36
COMM PLT
1 74
SERV PLT
2 53
STA PLT
0 17
S 1
2 20
S 3
8 5
S 2
1 3
S 4
2 4
BN HD
2 3 ELM
CHAPLAIN
0 1 1 0
PLT HQ
1 8
MSC CNTR
0 6
RADIO SEC
0 19
TACP SEC
0 12
WIRE SEC
0 14
MORT PTY
0 15
PLT HQ
1 4
SUPP SEC
0 8
MT SEC
1 19
ARMORERS
0 3
DINING FAC
0 19
PLT HQ
0 1
RADAR SEC
0 8
NDO SEC
0 4
SCOUT SEC
0 4
WEAPONS COMPANY
5 141
COMPANY
2 6 HQ
81mm MORT
2 80 PLT
PLT HQ
2 4
81mm SEC
0 19
81mm SQD
0 5
DRAGON
1 55 PLT
PLT HQ
1 4
DRAGON
0 17 SEC
DRAGON
0 2 TM
RIFLE CO
6 174
CO HQ
2 4
RIFLE PLT
1 42
PLT HQ
1 3
RIFLE SQD
0 13
FIRE TEAM
0 4
PLT HQ
1 2
MG SEC
0 22
MG SQD
0 7
ASSAULT
0 10 SECT
ASSAULT
0 3 SQD

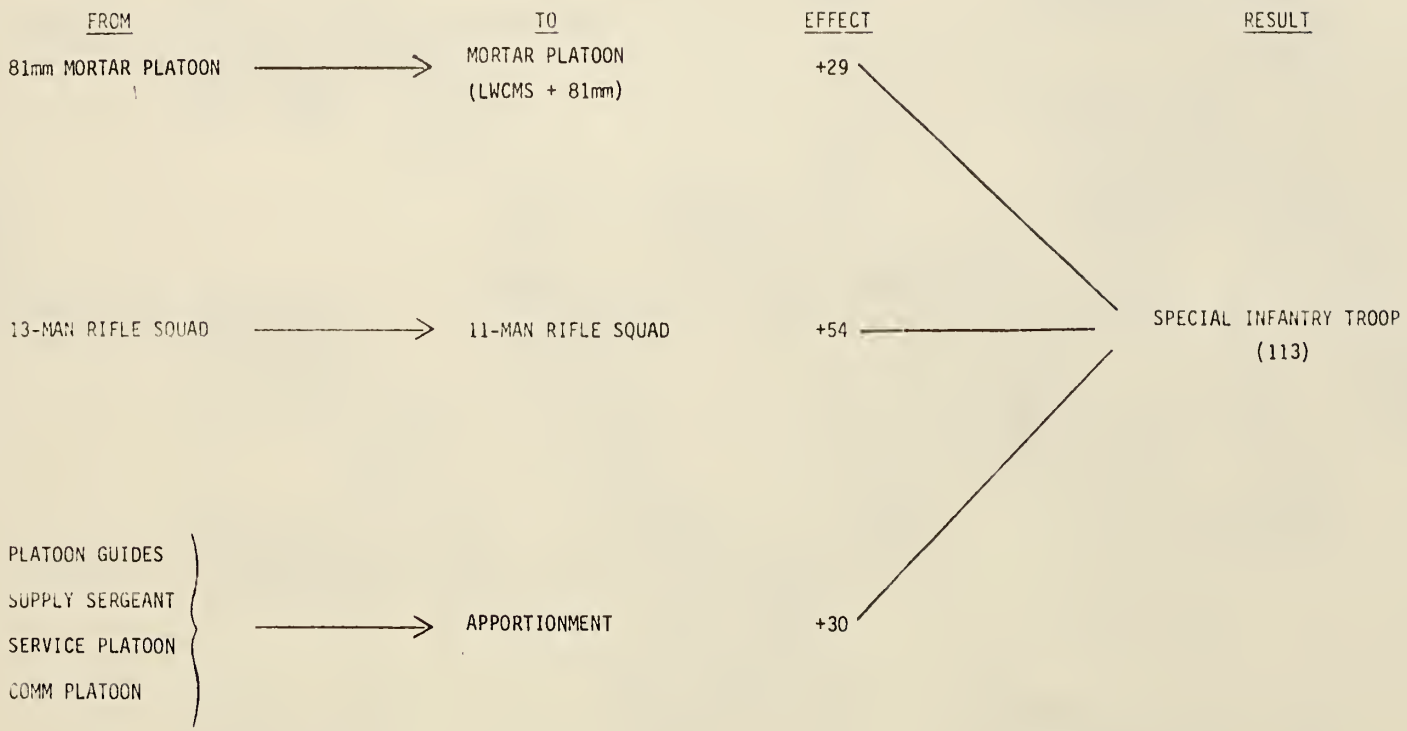
FY-81

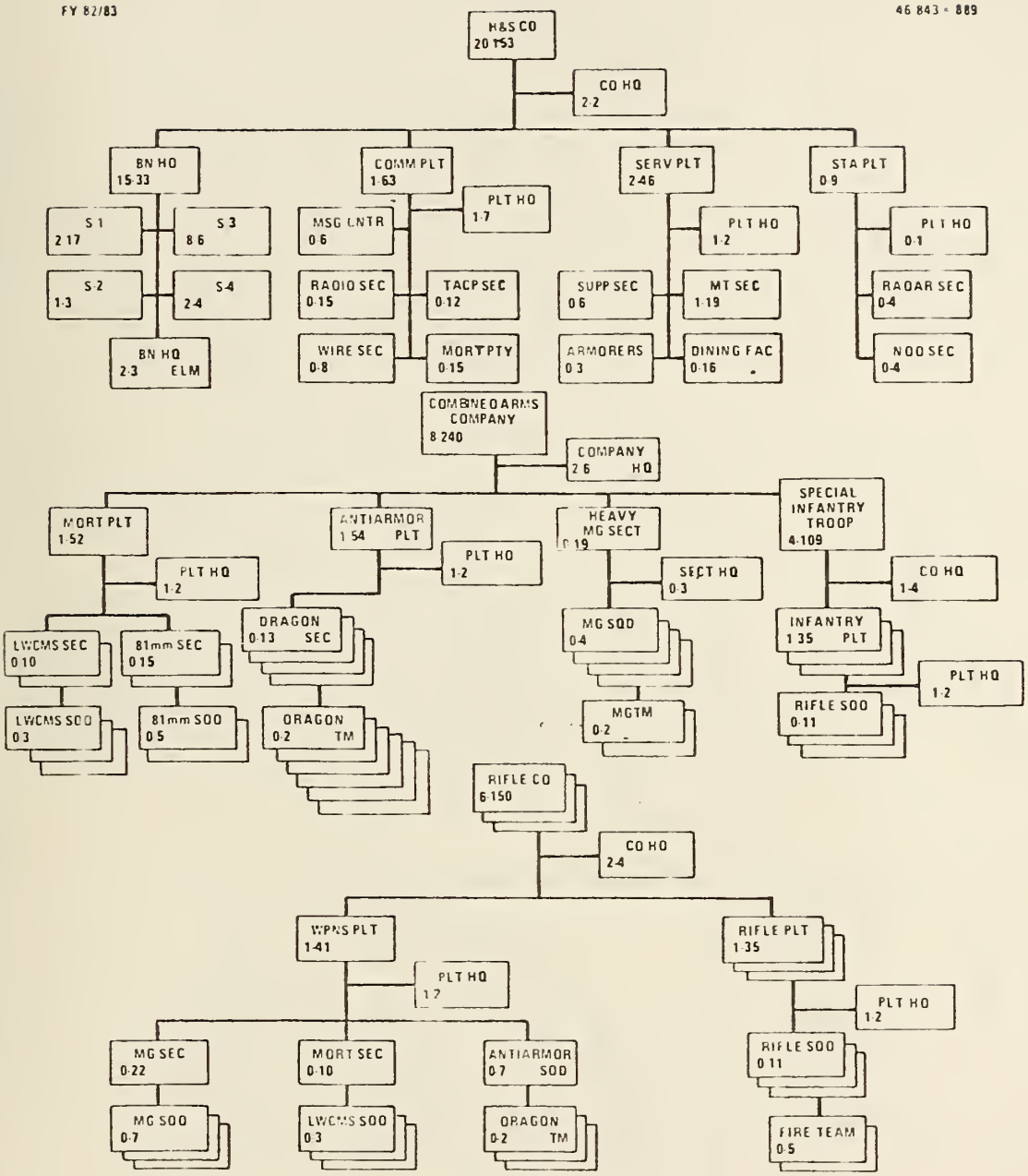

FROM
TO
EFFECT
RESULT
DRAGON PLATOON
3 x 8
DRAGON PLATOON
4 x 6
+1
ASSAULT SECTION
RIFLE COMPANY
ANTIARMOR SQUAD
RIFLE COMPANY
+9
HEAVY MACHINEGUN SECTION
STA PLATOON
STA PLATOON
+8

FY 81


H&S CO
20 175
CO HQ
2-3
BN HQ
15-36
COMM PLT
1-74
SERV PLT
2 53
STA PLT
0-9
S-1
2-20
S-3
8-5
MSG CNTR
0 6
PLT HQ
1-8
PLT HD
1-4
PLT HD
0-1
S-2
1-3
S-4
2-4
RADIO SEC
0 19
TACP SEC
0-12
SUPP SEC
0-8
MT SEC
1-19
RADAR SEC
0-4
WIRE SEC
0-14
MORT PTY
0 15
ARMORERS
0-3
DINING FAC
0-19
NOD SEC
0-4
BN HD
2-3 ELM
CHAPLAIN
0-1 1 0
WEAPONS
COMPANY
5 158
COMPANY
2 6 HD
81mm MORT
2-80 PLT
DRAGON
1 54 PLT
HEAVY
MG SECT
6 18
PLT HQ
2-4
PLT HQ
1-2
SECT HD
0-2
DRAGON
0-13 SEC
MG SQD
0-4
81mm SEC
0 19
DRAGON
0-2 TM
MG TM
0-2
81mm SQD
0 5
RIFLE CO
6 171
CO HQ
2-4
WPNS PLT
1-41
RIFLE PLT
1-42
PLT HQ
1-2
PLT HQ
1-3
MG SEC
0-22
MORT SEC
0-10
ANTIARMOR
0 7 SQD
RIFLE SQD
0-13
MG SQD
0-7
MORTAR
0 3 SQD
DRAGON
0 2 TM
FIRE TEAM
0-4

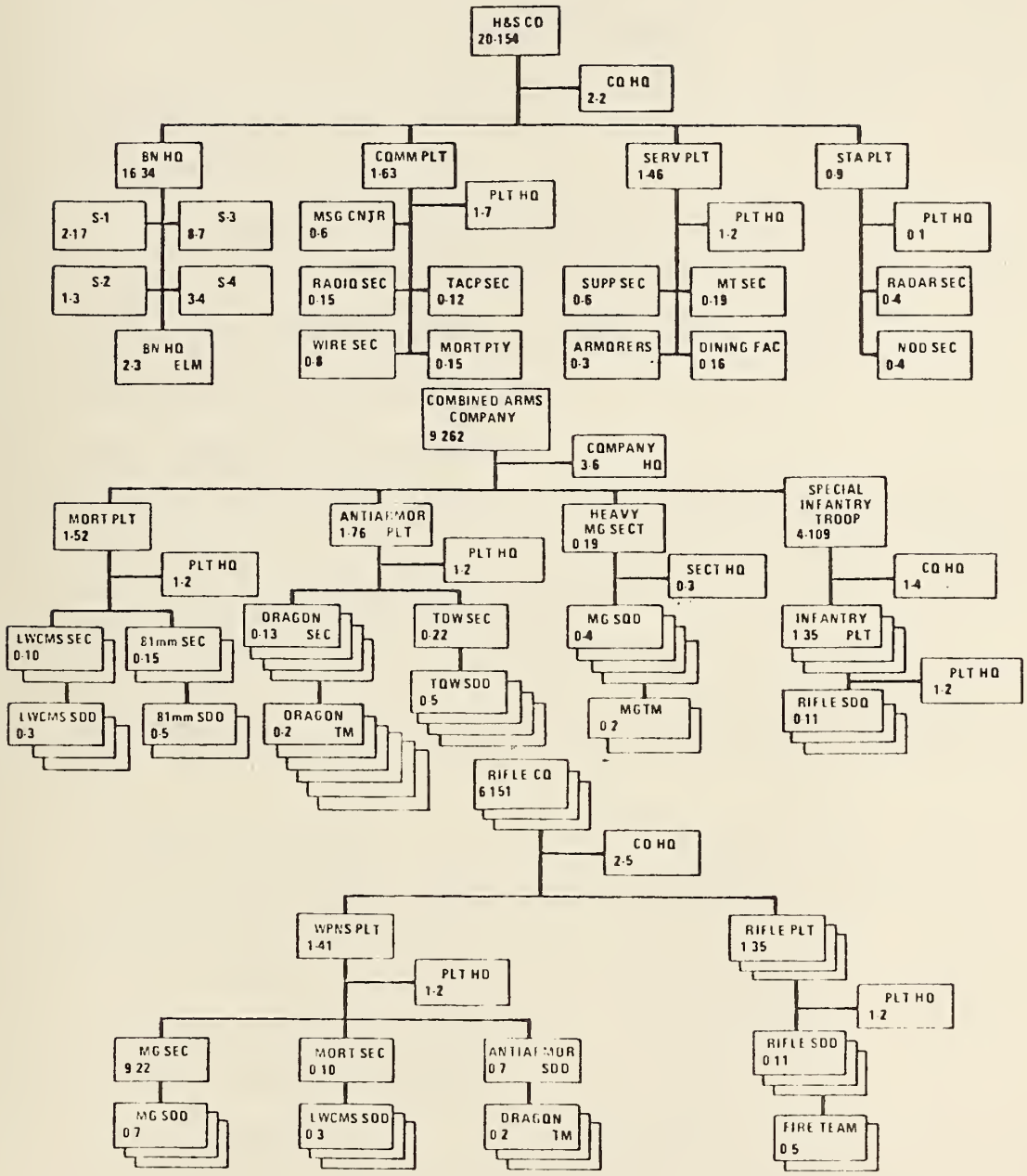
FY-82/83


FROM
TO
EFFECT
RESULT
81mm MORTAR PLATOON
MORTAR PLATOON
(LWCMS + 81mm)
+29
13-MAN RIFLE SQUAD
11-MAN RIFLE SQUAD
+54
SPECIAL INFANTRY TROOP
(113)
PLATOON GUIDES
SUPPLY SERGEANT
SERVICE PLATOON
COMM PLATOON
APPORTIONMENT
+30


H&S CO
20 153
CO HQ
2-2
BN HQ
15-33
COMM PLT
1-63
SERV PLT
2-46
STA PLT
0-9
S-1
2-17
S-3
8-6
S-2
1-3
S-4
2-4
BN HQ
2-3 ELM
MSG CNTR
0-6
PLT HQ
1-7
RADIO SEC
0-15
TACP SEC
0-12
WIRE SEC
0-8
MORT PTY
0-15
PLT HQ
1-2
SUPP SEC
0-6
MT SEC
1-19
ARMORERS
0-3
DINING FAC
0-16
PLT HQ
0-1
RADAR SEC
0-4
NOO SEC
0-4
COMBINED ARMS COMPANY
8-240
COMPANY
2-6 HQ
MORT PLT
1-52
PLT HQ
1-2
LWCMS SEC
0-10
81mm SEC
0-15
LWCMS SOO
0-3
81mm SOO
0-5
ANTIARMOR
1-54 PLT
PLT HQ
1-2
DRAGON
0-13 SEC
DRAGON
0-2 TM
HEAVY
MG SECT
0-19
SECT HQ
0-3
MG SOD
0-4
MGTM
0-2
SPECIAL
INFANTRY
TROOP
4-109
CO HQ
1-4
INFANTRY
1-35 PLT
PLT HQ
1-2
RIFLE SOO
0-11
RIFLE CO
6-150
CO HQ
2-4
WPNS PLT
1-41
PLT HQ
1-2
MG SEC
0-22
MG SOO
0-7
MORT SEC
0-10
LWCMS SOO
0-3
ANTIARMOR
0-7 SOO
DRAGON
0-2 TM
RIFLE PLT
1-35
PLT HQ
1-2
RIFLE SOO
0-11
FIRE TEAM
0-5

FY-84/85

FROM		TO	EFFECT	RESULT
889	⟶	AUTHORIZED 916	+27	TOW SECTION + ENHANCEMENTS


H&S CO
20-158
CO HQ
2-2
BN HQ
16 34
S-1
2-17
S-3
8-7
S-2
1-3
S-4
3-4
BN HQ
2-3 ELM
COMM PLT
1-63
PLT HQ
1-7
MSG CNJR
0-6
RADIO SEC
0-15
TACP SEC
0-12
WIRE SEC
0-8
MORT PTY
0-15
SERV PLT
1-46
PLT HQ
1-2
SUPP SEC
0-6
MT SEC
0-19
ARMORERS
0-3
DINING FAC
0 16
STA PLT
0-9
PLT HQ
0 1
RADAR SEC
0-4
NOD SEC
0-4
COMBINED ARMS COMPANY
9 262
COMPANY
3-6 HQ
MORT PLT
1-52
PLT HQ
1-2
LWCMS SEC
0-10
81mm SEC
0-15
LWCMS SOD
0-3
81mm SOD
0-5
ANTIARMOR
1-76 PLT
PLT HQ
1-2
DRAGON
0-13 SEC
TOW SEC
0-22
DRAGON
0-2 TM
TOW SOD
0 5
HEAVY MG SECT
0 19
SECT HQ
0-3
MG SOD
0-4
MGTM
0 2
SPECIAL INFANTRY TROOP
4-109
CO HQ
1-4
INFANTRY
1 35 PLT
PLT HQ
1-2
RIFLE SOD
0 11
RIFLE CO
6 151
CO HQ
2-5
WPNS PLT
1-41
PLT HQ
1-2
MG SEC
9 22
MG SOD
0 7
MORT SEC
0 10
LWCMS SOD
0 3
ANTIARMOR
0 7 SOD
DRAGON
0 2 TM
RIFLE PLT
1 35
PLT HQ
1 2
RIFLE SOD
0 11
FIRE TEAM
0 5

APPENDIX C

11-MAN RIFLE SQUAD

SECTION 1

101. MISSION

Reconfiguration of the Marine Rifle Squad does not change its mission. The mission of the rifle squad is to "locate, close with, and destroy the enemy by fire and maneuver, or repel the enemy's assault by fire and close combat."

102. ORGANIZATION AND ARMAMENT

The rifle squad is divided into two fire teams, each of which is built around an automatic weapon and controlled by a fire team leader.

103. COMPOSITION OF THE RIFLE SQUAD

The squad is composed of 11 men: a sergeant (squad leader) and two fire teams of five-men each. Each fire team is organized as follows:

BILLET	RANK
Fire Team Leader	Corporal
Automatic Rifleman	Lance Corporal
Grenadier/Rifleman	Lance Corporal
Assault Rifleman	Private
Rifleman	Private

104. WEAPONS

a. Organic Weapons--The organic weapons of the squad are as follows:

(1) Squad Leader--M16 rifle and bayonet knife.

(2) Fire Team Leader--M16 rifle and bayonet knife.

(3) Automatic Rifleman--M16 rifle and bayonet knife.

(4) Grenadier/Rifleman--M16 rifle with a 40mm, M203 grenade launcher attached and bayonet knife.

(5) Assault Rifleman--M16 rifle with a 40mm, M203 grenade launcher attached and bayonet knife.

(6) Rifleman--M16 rifle and bayonet knife.

b. Supplementary Weapons--The following is a list of weapons and munitions available to members of the squad:

(1) Demolitions.

(2) Ground signals and flares.

(3) Antitank and antipersonnel mines.

(4) Rocket launchers--antitank (LAAW/VIPER) and assault (SMAW).

(5) Grenade launchers.

(6) Rifle grenades.

(7) Hand grenades.

(8) Riot control agent dispenser.

(9) Night optical scopes.

c. Additional Weapons--The following is a list of weapons that might be operating with a rifle squad:

(1) Machineguns.

(2) Mortars.

(3) Flame weapons.

(4) Antitank rocket launchers (DRAGON or TOW).

(5) Recoilless rifles.

(6) Sniper rifles.

(7) Night optical devices (NODs).

(8) Ground radars.

(9) Automatic grenade launchers.

d. Future Weapons--In order to ensure the rifle squad maintains a high firepower potential, the following weapons will be phased into the squad as they are acquired:

(1) Squad Automatic Weapon--will be issued to the automatic rifleman of each fire team and will provide longer range and higher volume fires.

(2) Shoulder-Launched Multipurpose Assault Weapon (SMAW)--will be issued as a munition to squad members. Specifically designed to defeat walls and bunkers, it will be carried when needed by the assault rifleman.

(3) Improved Rifle--will be issued as a replacement for the M16 rifle.

105. DUTIES OF INDIVIDUALS

a. General. Every man of a fire team must know the duties of the other team members, and in turn, the fire team leader and the squad leader should be able to assume the duties of their next superior.

b. Squad Leader. The squad leader carries out the orders issued to him by the platoon commander. He is responsible for the discipline, appearance, training, control, conduct, and welfare of his squad at all times, and for the condition, care, and economical use of its weapons and equipment. In combat, he is also responsible for the tactical employment, fire discipline, fire control, and maneuver of his squad. He takes position where he can best carry out the orders of the platoon commander and observe and control the squad.

c. Fire Team Leader. The fire team leader carries out the orders of the squad leader. He is responsible for the fire discipline and control of his fire team and for the condition, care, and economical use of its weapons and equipment. In carrying out the orders of the squad leader, he takes a position to best observe and control the fire team. Normally, he is close enough to the automatic rifleman and the grenadier/rifleman to exercise effective control of their fires. In addition to his primary duties as a leader, but not to the detriment of them, he serves as a rifleman. The senior fire team leader in the squad serves as assistant squad leader.

d. Automatic Rifleman. The automatic rifleman carries out the order of the fire team leader. He is responsible for the effective employment of the automatic rifle and for the condition and care of his weapon and equipment.

e. Grenadier/Rifleman. The grenadier/rifleman carries out the orders of the fire team leader. He is responsible for the effective employment of the grenade launcher, his rifle, and for the condition and care of his weapons and equipment.

f. Assault Rifleman. The assault rifleman carries out the orders of the fire team leader. He is responsible for the effective employment of his rifle and grenade launcher, and the special purpose assault weapon, and for the condition and care of his weapons and equipment.

g. Rifleman. The rifleman in the fire team carries out the orders of the fire team leader. He is responsible for the effective employment of his rifle and for the condition and care of his weapon and equipment. The rifleman is trained as a scout. The rifleman is prepared to assume the duties of the automatic rifleman.

SECTION 2

201. GENERAL

Combat formations and signals enable the squad leader to control the fire and maneuver of his squad when moving to and assaulting an enemy position.

202. BASIC COMBAT FORMATIONS

a. Fire Team -- Basic combat formations (see figure C-2-1) are:

(1) Column.

(2) Wedge.

(3) Box.

(4) Diamond.

(5) Skirmishes.

(6) Echelon.

b. Squad--Basic combat formations (see figure C-2-2 and C-2-3) are:

(1) Squad column.

(2) Squad echelon (right/left).

(3) Squad line.

(4) Squad vee.

(5) Squad wedge.

c. Individual Disposition.

(1) The squad leader places himself within the squad formation where he can best exercise control. The fire team leaders place themselves in the designated formations or as directed by the squad leader. Other members of the squad take their appropriate positions based on the location of the fire team leader or as he directs.

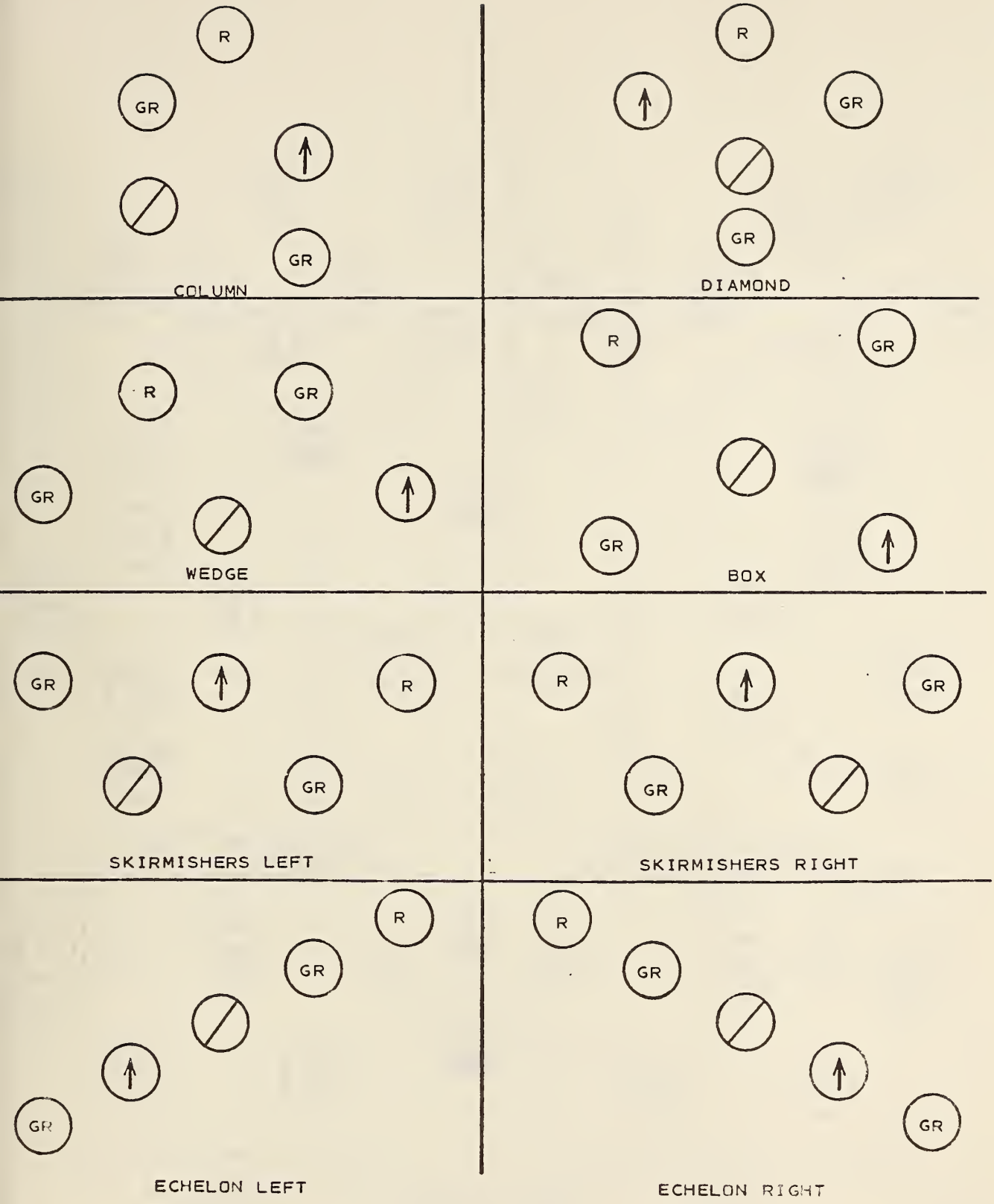


Figure C-2-1. Basic Formations of the 5-Man Fire Team.

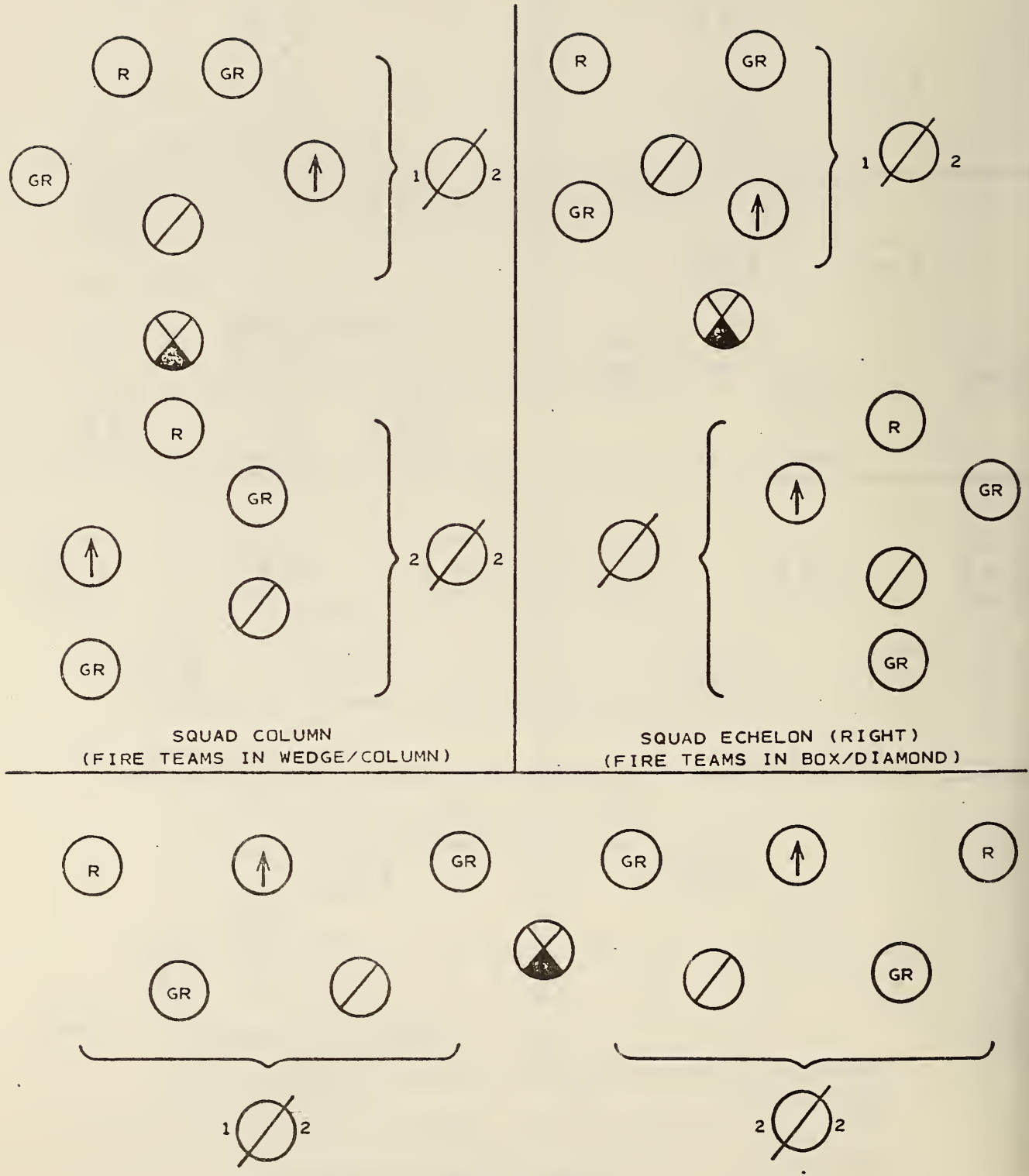
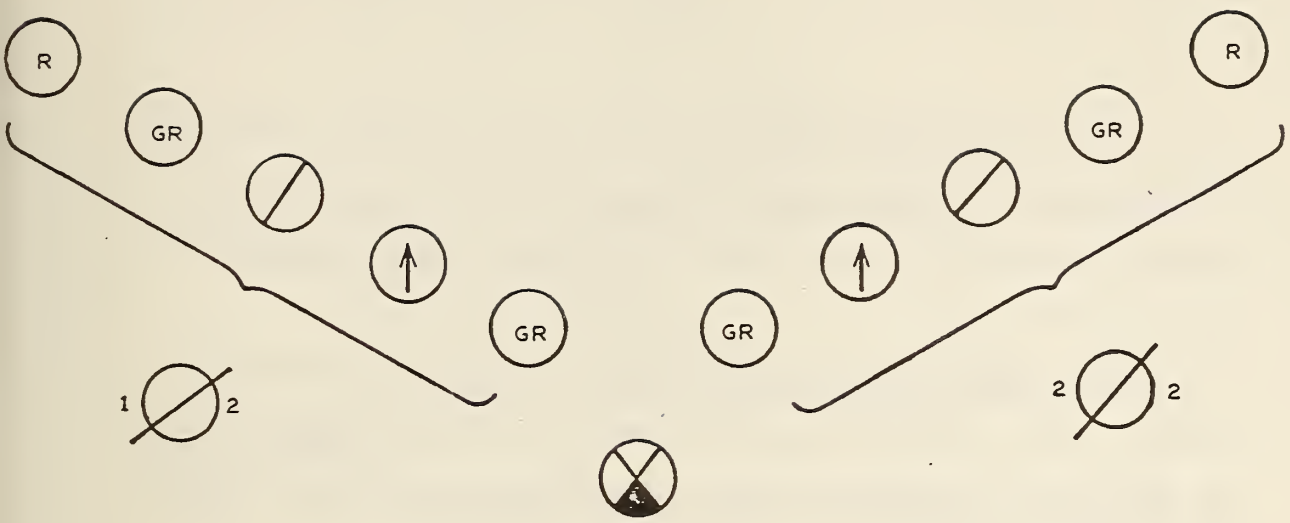
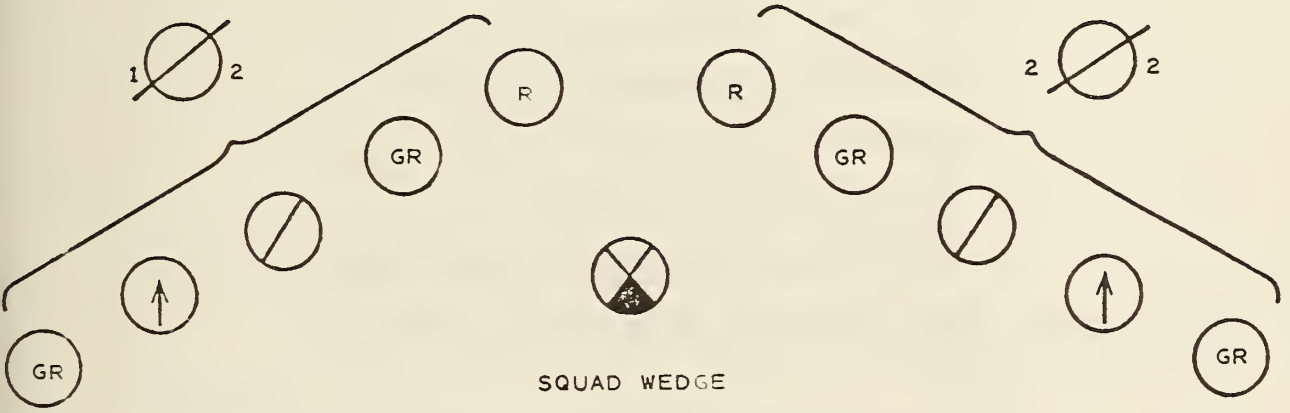


Figure C-2-2. Basic Combat Formations 11-Man Squad, 2-5 Man Fire Teams.



SQUAD VEE

(FIRE TEAMS IN ECHELON)



SQUAD WEDGE

(FIRE TEAMS IN ECHELON)

Figure C-2-3. Basic Combat Formations 11-Man Squad, 2-5 Man Fire Teams.

(2) The distance between men vary within a formation, depending on visibility and terrain. While maximum dispersion is desirable to reduce vulnerability to direct and indirect fires, effective control must be maintained.

(3) Combat formations are selected to conform to the factors of METT. When it becomes necessary to modify them, the changes are made by the shortest practicable route avoiding backward and lateral movement.

203. CHARACTERISTICS

a. Fire Team Formations--The characteristics of fire team formations are as follows:

(1) Column

(a) Facilitates control.

(b) Favors fire and maneuver to the flanks.

(c) Vulnerable to fire from the front.

(d) Fire to the front is limited.

(e) Used when speed and control are governing factors such as through woods, fog, smoke, and along roads and trails.

(2) Wedge

(a) Facilitates control.

(b) Provides all-round security.

(c) Formation is flexible.

(d) Fire is adequate in all directions.

(e) Used when enemy situation is uncertain and terrain and visibility require dispersion.

(3) Skirmishers Right (Left)

(a) Difficult to control.

(b) Maximum firepower to front.

(c) Used when the location and strength of the enemy are known, during the assault, mopping up, and crossing short, open areas.

(4) Echelon Right (Left)

(a) Difficult to control.

(b) Movement is slow, especially under conditions of reduced visibility.

(c) Provides heavy firepower to front and in direction of echelon.

(d) Used to protect an open or exposed flank.

(5) Diamond

(a) Easy to control.

(b) All-around protection.

(c) Formation is flexible.

(6) Box

(a) Easiest to control.

(b) All-around security.

(c) Used when enemy strength is not known and both flanks are open.

b. Squad Formations--The characteristics of squad formations are similar to those of the fire team. The vee formation used by the squad is not used by the fire team. The fire team's skirmishers right (left) formation is called squad line.

(1) Squad Vee

(a) Facilitates movement into squad line.

(b) Provides excellent firepower to front and flanks.

(c) Provides all-round security.

(d) Used when the enemy is to the front and his strength and location are known. May be used when crossing large open areas.

(2) Squad Line--See discussion under fire team formations for skirmishers right (left) in subparagraph 3103a(3).

Appendix A. Copies of FMF Responses

This appendix consists of responses of Fleet Marine Forces that were received by the infantry battalion study team. The responses include the comments solicited from each command upon review of the draft final report of the Marine Infantry Battalion 1980-1990.

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Comments of Commanding General, Fleet Marine Forces, Pacific

UNITED STATES MARINE CORPS
HEADQUARTERS, FLEET MARINE FORCE, PACIFIC
CAMP H. M. SMITH, HI 96861

IN REPLY REFER TO:
50PP/CAM/rap
3900
11 Jul 1980

From: Commanding General
To: Commanding General, Marine Corps Development and Education Command, Quantico, Virginia 22134

Subj: Marine Infantry Battalion Structure (1980 - 1990)

Ref: (a) CG MCDEC ltr D 032/LES/jah 3900 of 18 Apr 80

1. The subject study, transmitted by the reference, has been reviewed and the following comments are provided:

a. A basic finding of the study is that the optimum infantry battalion structure for the 1980's contains four rifle companies with squads constrained by manpower ceilings to two five-man fire teams. That finding is supported, even though it is not clear that it has been analytically derived. It is agreed that the four-rifle-company structure can best provide the flexibility and mobility required by our mission.

b. The study correctly states that since worldwide urbanization has occurred primarily in littorals, the requirement to be able to conduct amphibious operations implies a concurrent requirement to be able to conduct urban warfare operations. The study, however, fails to address any of the unique and demanding requirements of urban warfare -- on the premise that the ability to conduct urban operations is a "logical corollary" to (i.e., the result of) amphibious capability. This is an unsupportable premise--urban and amphibious operations are quite different. Further, the Marine Corps' need to thoroughly understand and be prepared for urban operations is underscored by the nature and extent of its involvement in the Rapid Deployment Force. It is, therefore, recommended that the impact of alternative structures on operational effectiveness in an urban environment be thoroughly examined prior to the adoption/approval of a structure for the 1980's.

c. The primary measure of combat effectiveness used in the study was unit resiliency/recoverability--as determined by the AMORE computer model. And yet, only the current (I series) organization was subjected to AMORE modelling. It is recommended that all viable alternative structures be similarly evaluated.

d. The significance of the wargame is questionable, except that it qualitatively demonstrates the inadequacies of our current infantry battalion structure and weapons vis-a-vis the Soviet Motorized Rifle Battalion. (Five of six wargame players suffered unfavorable changes in force ratio). Since the

MCDEC (5)

game appears to have violated a fundamental principle of experimental test design--i.e., that test parameters be varied one at a time--any inferences of organizational superiority are necessarily suspect. The 12 plays of the wargame involved two routes of advance, two battalion structures, two supporting arms assumptions, and six players--far too many variables to reliably isolate or quantify specific causes. For example, the preferred option is a combination of different structure ("C") and different weapons distribution and types. The extent to which the preference results from structure or from other factors is not clear. Correspondingly, it is assumed that at least some of the new weapons (e.g., the Lightweight Company Mortar System and Shoulder-launched Multi-purpose Assault Weapon) would be introduced to the baseline/current structure in any event, so it is misleading to associate the resulting firepower and effectiveness enhancement purely to structure.

e. Field evaluation consisted of exercising six squads for two days. Considering the potential consequences for the Marine Corps of the 1980's (and possibly beyond), far more exhausting and strictly controlled testing is recommended.

f. Although the study report repeatedly extolls the virtues of the four-rifle-company structure, the preferred option contains three rifle companies and a "Special Infantry Troop" in the Combined Arms (i.e., weapons) Company. Both the location and title appear counter-productive to the intent of this structural element. Its location would undoubtedly ensure that it would be permanently relegated to the status as Battalion working party and command post security, regardless of conceptual intent. Also, the title suggests technical and elitist orientations that are similarly undesirable.

g. The overall readability and impact of the study would be greatly enhanced by a concise (i.e., ten pages or less) summary and conclusions section. In the draft version reviewed, this function is served by two sections totalling 92 pages. A glossary of abbreviations and acronyms is also needed.

2. In summary, the subject study appears to be a collection of semi-independent analyses whose collective "bottom line" is unclear. The selection of a preferred structure is based almost exclusively on military judgment, an intangible and totally subjective tool that can best serve to interpret or direct study efforts--but never to optimize study parameters. The study does, however, identify the shortcomings of the current infantry battalion and supporting arms composite. It is, therefore, a good first step. Subsequent steps could include identification of additional alternative structures for rigorous testing and evaluation, during which all analytic techniques and measures of effectiveness would be applied equally to all alternatives. Additionally, the impact of any contemplated changes on the rest

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of the Marine Corps must be carefully examined. Such examinations should include not only operational but also fiscal considerations. For example, does placing TOW in the infantry battalion reduce the requirement for TOW in the Tank Battalion? What is the overall impact of the implied additional logistical burden, or the need for additional technical personnel? Finally, the study should include a sensitivity analysis to identify those assumptions and/or variables that are most critical to the result(s).

3. Although the basic premise and thrust of the study are supported, prior to the final selection of an "Infantry Battalion Structure for the 1980's", additional analysis of issues as indicated above is highly recommended.

A. W. ODONNELL

Comments of Commanding General, Fleet Marine Forces, Atlantic and Commanding General, 2d Marine Division

UNITED STATES MARINE CORPS
HEADQUARTERS
FLEET MARINE FORCE ATLANTIC
NORFOLK VIRGINIA 23511

IN REPLY REFER TO
G-3OPS:JRB:alw
3900
2 JUN 1980

From: Commanding General
To: Commanding General, Marine Corps Development and Education Command, Quantico, Virginia 22134

Subj: Marine Infantry Battalion Structure 1980-1990

Ref: (a) CG MCDEC ltr D 032/LES/jah over 3900 of 18 Apr 80

Encl: (1) CG 2d MarDiv ltr 3/CES/rlf over 3900 of 29 May 80

1. As requested by the reference, the draft study of the Marine Infantry Battalion 1980-1990 has been reviewed. Enclosure (1), concurred in by this headquarters, is a detailed analysis of that study which is hereby submitted for incorporation into the final report.

E. J. Miller

Copy to:
CMC (Codes OP + TR)
CG, FMFPAC
CG, 2d MarDiv
CG, 4th MarDiv
CG, 4th MAB

JUN 9 1980
MCDEC 80
BT. NO. 2145

UNITED STATES MARINE CORPS
2D MARINE DIVISION, FLEET MARINE FORCE
CAMP LEJEUNE, NORTH CAROLINA 28542

3/CES/rlf
3900
29 MAY 1980

From: Commanding General, 2d Marine Division, FMF Camp Lejeune North Carolina 28542
To: Commanding General, Fleet Marine Force, Atlantic, Norfolk Virginia 23511

Subj: Marine Infantry Battalion Structure, 1980-1990

Ref: (a) CMC 090916Z May 1979
(b) CG MCDEC ltr D 032/LES/jah 3900 dtd 18 Apr 1980
(c) CG FMFLANT 222221Z Apr 1980

Encl: (1) Degradation of Command and Control, Administrative, and Logistical Capabilities of the Structure C Marine Infantry Battalion
(2) Infantry Battalion Structure Concept
(3) Organic Versus Task Organized TOWs and Dragons
(4) Infantry Battalion Mortar Platoon
(5) Structure "C Modified"
(6) Structure "A Modified"

1. Reference (a) tasked the Commanding General, Marine Corps Development and Education Command (CG, MCDEC) to develop an optimum infantry battalion table of organization (T/O) for the 1980s in conjunction with the Fleet Marine Force Commanders and the Commanding General, 4th Marine Division. Reference (b) forwarded draft copies of the CG, MCDEC report for review and requested input by 16 May 1980. Copies of that report, in sufficient quantity to distribute to the General Staff and Infantry Regiments were received by this Command on 6 May 1980. Reference (c) requested detailed comments and recommendations concerning the draft report by 14 May 1980. Subsequent to the receipt of reference (c), and because of the delayed receipt of reference (b), verbal approval for a day-by-day extension of the 14 May 1980 deadline was sought and received so that a more thorough review of reference (b) could be conducted.

2. The proposed structure (structure C) is initially attractive in that it returns the fourth maneuver element to the infantry battalion. It also increases the number and type of supporting arms organically assigned to the infantry battalion commander in the form of small arms, indirect fire, and antitank weapons. However, four maneuver elements, more supporting arms, and an "about 900" man personnel limit may not be completely compatible goals. In order to make four maneuver elements and increased fire support come from an "about 900" man ceiling, adjustments had to be made. In this instance important command and control, administrative, and logistical billets such as the motor transport officer, platoon guides, four billets from battalion supply, four radio operators, six wiremen, three cooks,

ENCLOSURE (1)

and most of STA platoon will be lost. These billets and others are addressed individually in enclosure (1). A positive note is the inclusion of two legal clerks in the S-1 section, 1 or 2 NBC specialists in the S-3 section and a possible administrative clerk in the S-3 section (page VII-5 of the draft study refers to one administrative clerk (MOS 0151) and one NBC specialist (MOS 5711) while page VII-49 of the draft study refers to an increase of two NBC specialists and does not refer to an administrative clerk).

3. The concept for organizing the Marine infantry battalion needs to be carefully considered. Enclosure (2) discusses this concept from the point of view of task organizing the infantry battalion, versus organizing the infantry battalion, to counter the "threat". The "threat" is defined as the Soviet or Soviet model force discussed in chapter II of the draft study. It appears that a goal of the study was to organize an infantry battalion, to include decentralization of weapons, to counter the specific "threat" (almost in a vacuum) instead of organizing an infantry battalion which as part of a MAGTF could defeat the "threat" as well as other likely threats.

4. Enclosures (3) and (4) discuss specific weapons for the infantry battalion. Enclosure (3) is a discussion of the placement of the TOW and Dragon weapons in the infantry battalion and infantry regiment; the recommendation is that TOWs ought to be centralized for training and management at the regimental level and then employed (task organized) by the regimental commander to weight the attack or defense. Dragons should likewise be trained and managed at infantry battalion level and then task organized by the battalion commander to weight the attack or defense. Enclosure (4) considers the pros and cons of the dual weapon mortar platoon (81mm mortars and 60mm LWCMS) at the battalion level; it maintains that the personnel benefits from organizing as a dual weapon mortar platoon are not as great as indicated in the structure study and that there will be problems with a dual weapon mortar platoon such as different types of ammo, two gun loops, and safety considerations which will make it more practical to organize the platoon with eight 81mm mortars for the present.

5. More time would have been necessary to completely analyze the draft study and to provide detailed comments and recommendations on all of the proposals contained in the report. The following is a list of topics and statements which could not be fully developed because of time constraints.

a. The concept of placing additional weapons in an unmanned arsenal for use as required should be avoided because it will result in less than fully trained crews and half-maintained weapons.

b. An antiair weapon (Redeye/Stinger) would be a desirable weapon at regimental or infantry battalion level;

control measures should be coordinated and small unit leaders trained to make this a reality as soon as possible.

c. The M2 .50 caliber machinegun is a desirable weapon at the infantry battalion level only if adequate means to mount and transport the weapon are provided. Mounting the weapon on vehicles primarily used for other purposes (company commander, S-1, MTO) should be avoided.

6. Enclosure (5) is provided to show the modification of structure "C" which results if the recommendations contained throughout this letter are implemented. The heavy machinegun section has been deleted because it should not be organic to a battalion without proper vehicular support to mount it, transport it, and carry ammo; personnel from the section were used to fill some of the structure "C" inadequacies. The TOW section does not appear in this structure because it would now be part of an antiarmor platoon at the infantry regiment. Only enough personnel and eight of the nine trackers from the weapons platoon antiarmor squads (Dragon) were added to the antiarmor platoon in the weapons company to bring that unit up to four sections of eight antiarmor teams per section. A squad of LWCMS (60mm mortars) and a squad of machineguns were added to each weapons platoon to reinforce these units and provide additional direct fire and indirect fire to the rifle company commander as was the case with the "X" series T/O. The first sergeant of the special infantry troop was deleted because there is already a first sergeant in the combined arms company. And lastly, two messengers/drivers were added to H&S company because, as headquarters commandant, the H&S company commander will also require messengers and a driver. The strength for this structure with four squads in each section of the weapons platoons is 48/896 (total 944). If the structure is further modified by removing the fourth squad from each section of the weapons platoons the resulting infantry battalion strength would be 48/866 (total 914) -- less than the strength of MCDEC's structure "C".

7. Enclosure (6) is the structure recommended by this command. By combining the special infantry troop and the fourth mortar and machinegun squads from each of the three rifle companies of structure "C Modified" and adding a company commander, a weapons platoon headquarters, and weapons platoon section leaders, a fourth complete rifle company (maneuver element) is formed. This structure can also be formed by modifying structure "A" with the recommendations contained in enclosure (1), (3), and (4) and is therefore called structure "A Modified". Although not part of structure "A", the antiarmor platoon (TOW) should still be formed in the headquarters company of the infantry regiment. This structure is superior because it contains four complete maneuver elements and is most like the time-proven Marine Infantry Battalion. Its total strength, 49/899 (total 948), is similar to structure "C Modified" and is considered to be the minimum strength figure for the infantry battalion.

8. The 2d Marine Division Point of Contact for infantry battalion structure matters is the Assistant Chief of Staff, G-3 (Plans) (phone AV 484-3080/3089).

D. M. TWOMEY

DEGRADATION OF COMMAND AND CONTROL, ADMINISTRATIVE, AND LOGISTICAL CAPABILITIES OF THE STRUCTURE C MARINE INFANTRY BATTALION

1. Discussion. The draft Marine Infantry Battalion Structure Study, 1980-1990 (Structure C) has attempted to maximize firepower and provide for a fourth maneuver element. However it has done so at the expense of certain command and control, administrative, and logistical billets. These billets, addressed individually below, are all important to the smooth funtioning and combat capability of the Marine infantry battalion and should not be sacrificed. Individually, their loss may or may not be that serious; however, taken together their loss will result in a significant reduction in the capabilities of the infantry battalion.

a. Motor Transport Officer. The proposed infantry battalion structure has traded away the motor transport officer for a full-time embarkation officer without any concrete justification to support the change. The infantry battalion motor transport section manages and maintains about 57 motorized, wheeled vehicles plus about 20 trailers. The motor transport officer is the only officer specialist in his field at the infantry battalion level. The adverse impact on readiness resulting from a previous change in which the 3502 MOS was temporarily changed from an unrestricted to a restricted MOS is still being felt. If the proposed structure C of the study is adopted, the load on the motor transport section will in fact, increase by the addition of 13 assorted 1/4 ton TOW vehicles and 4 trailers. The only change to this picture in the near future is the introduction of a new 5/4 ton high mobility vehicle in the 1980s; this change is supposed to result in the loss of all 1/4 ton trailers. If anything, this new vehicle will initially result in more challenges to the leadership and management skills of the motor transport officer because of its newness. The billet of motor transport officer should not be dropped from the Marine infantry battalion structure for the 1980s.

b. Special Infantry Troop Commander. If the proposed structure C Combined Arms Company with Special Infantry Troop is adopted, the commander of the special infantry troop will have the same responsibilities towards his Marines as any other tactical unit commander. He may not have the NJP and adminstative responsibilities, but he will be responsible for their training and employment. The jobs of combined arms company XO and special infantry troop commander do not fit well together. The combined arms company XO would orient himself primarily towards the company rear area to include administrative and logistical matters for the entire company; the special infantry troop commander would orient his thinking to the field and the tactical training and employment of his Marines. These two billets should not be assigned to the same person; he could not concurrently be in the field training his special infantry troop and in the company rear area performing the duties of company XO. However, by moving the special infantry troop XO into the combined arms company XO billet, the combined arms company XO (a Capt) can become the full-time commander of the special infantry troop. Since the special infantry troop is not a company, it does not need an XO or first sergeant; these billets are already manned at the combined arms company level.

c. Platoon Guides. The study recognizes the duties of the platoon guide but dismisses the billet by stating that his duties can be effectively absorbed by the platoon sergeant, messenger, and platoon corpsmen. The platoon sergeant has full time duties which would suffer if he were to take over part of the duties of the platoon guide; additionally, he would probably have to take over the majority of those duties because he, the platoon commander, and the squad leaders are the only other persons in the platoon with the experience necessary to fill this billet--the platoon commander and squad leaders have primary troop leading/training responsiblities. The billets of messenger and corpsman are not considered suitable to assume guide responsibilities because the messenger is a junior enlisted Marine and would require detailed supervision and the corpsman must be able to devote 100 percent of his time to medical duties. Additionally, corpsmen, by participating in combat service support duties such as ammunition resupply, would be liable to loss of their protection as noncombatants under the Geneva Convention. The billet of platoon guide should not be lost in the Marine infantry battalion reorganization.

d. H&S Company Supply Sergeant. Justification for loss of this billet is that it is redundant in view of the size of the company and the subordinate service platoon. H&S company may be small in numbers, but in the field, the responsibilites of this unit are many and varied. The company commander, as headquarters commandant, is responsible for the physical operation of the command post to include erection, displacement, day-to-day functioning, and resupply. The company supply sergeant along with the company gunnery sergeant, is one of the very few people upon whom the H&S company commander can depend for work in the field CP without having to share his time/loyalties with another section. The loss of the company supply sergeant would result in a severe overload for the H&S company gunnery sergeant. The size of the H&S company service platoon is not related to the functions of the company supply sergeant; every person in the service platoon has responsibilities which are separate and distinct from those of the company supply sergeant. The billet of H&S company supply sergeant is necessary for efficient functioning of H&S company in garrison and in the field.

e. Battalion Supply Personnel, OF 30

(1) The proposed structure recommends deletion of two corporal 3043 billets from the service platoon headquarters, and one lance corporal 3051 and one private first class 3043 billets from the supply section, service platoon. This amounts to a 33 percent reduction in supply personnel with no substantial reduction in equipment assets. The equipment reductions fall into two categories: (a) 782 gear and (b) personal weapons. The reduction of approximately 300 sets of 782 gear does not reduce the work load on the supply section because the majority of these items are not held in a warehouse but are issued to personnel assigned to a unit. Additionally, because most of these items do not require repair parts, only minimal work is required by the supply section. The supply actions required to account for the reduced number of personal

weapons in the proposed structure represent a minimal reduction in actual work, because the daily/weekly/monthly weapons inventories are accomplished by armory or nonsupply personnel. The process of repair parts requisitioning for weapons is similarly only negligibly affected since most battalion armories order their repair parts in bulk for replenishment of preexpended bins.

(2) At present, an infantry battalion still possesses the same number of crew served weapons and pieces of communications equipment, motor transport equipment and engineer equipment that it had when the total strength of the unit was 1254 and will possess more equipment if structure C is implemented. A significant portion of a supply section's efforts are directed at procuring repair parts for the major end items which it possesses. The quantity of these communications, motor transport, ordnance (less personal weapons), engineer and general supply (less individual equipment) items has not been reduced with the change in the structure; therefore the required work load has not been reduced.

(3) An additional fact to take into consideration is that while the present Table of Organization for supply personnel reflects 12 enlisted, the infantry battalions within the Second Marine Division have found out that this is not a sufficent number of people to enable proper supply support to take place. Consequently each supply section has been augmented by an average of 3.5 additional nonsupply personnel.

(4) This proposed reduction in supply personnel, without a proportionate reduction in the amount of equipment to be supported, can only lead to the degradation of supply support; therefore, billets should not be deleted from the present supply organization.

f. Transfer of Five 0151s from the Battalion Adminstration Center to Company Offices. This proposal appears to be one which would subvert the concept of consolidated battalion level administration and is contrary to CMC guidance which centralized all administrative functions in the battalion headquarters. Specifically:

(1) Junior enlisted administrators are not viewed as effective liaison personnel between company and battalion headquarters (one of the stated purposes of this proposed realignment). Such liaison is and should continue to be the responsibility of the unit first sergeant and executive officer.

(2) Placing a lone administrator at the company level would mean that that Marine would have no opportunity to cross-train in other administrative skills required for advancement to NCO/SNCO supervisory billets. The administrative talent in the battalion must be pooled under the guidance of the battalion adjutant/personnel officer and personnel administrative chief if the goal of consolidated administration is to be effectively and efficiently realized. The move of even these few administrators back to the company level is seen as the first step in deteriorating the consolidated administrative concept and eventually returning to the

less efficient decentralized (unit level) mode of administration. This move would also reduce the enlisted OF 01 strength in the battalion administration center by 25 persent (from 20 to 15).

(3) Realizing that some administrative functions such as typing and simple filing do occur at the company level, company messengers can be selected by the executive officer/first sergeant to perform these tasks and that of a training records clerk. H&S company should be provided company messengers by T/O who could be trained to work in the company office as typists and training records clerks.

(4) As an aside, should the move of these several administrators be subsequently approved by CMC, it would seem that one of them should be placed in the H&S Company headquarters rather than in the Special Infantry Troop.

g. Reduction in Number of Radio Operators. The "I" series T/O reduced the number of trained radio operators from 48 to 40 per infantry battalion without an accompanying reduction in requirements. The proposed battalion structure "C" would further reduce this figure to 36 and at the same time, apparently increase single channel radio requirements (see item No 2, negative features, pg. VII-22). This proposed change to the communication platoon will leave 10 radio operators in the mortar support section, to operate the battalion mortar net, and 12 in the tactical air control party section, to operate the TACP local, TAD and TAR nets for two FACs and the Air Liaison Officer. This structure has been used in both the "M" and "I" series T/Os and has proven adequate. This leaves 14 radio operators in the radio section. One is the radio supervisor (sergeant 2531) who is not normally assigned a radio circuit watch but assists the radio chief in managing the total operations of the battalion. This leaves 13 radio operators to handle one station on three regimental nets (command, tactical and intelligence). Additionaly, they always operate the battalion tactical net No 1 and sometimes battalion tactical net No 2. To insure the smooth efficient and reliable operation of the tactical nets requires school-trained, full time radio operators for the COC, the commanding officer, and each company commander (this would include one for the special infantry troop). Each station of each radio net operated at the battalion headquarters will require two or three operators for sustained, full time operation, as well as during displacements. Additionally radio operators are required to perform duties such as equipment maintenance, remoting, antenna farm watch, and the set up and operation of relay sites. It should also be reasonable to say that all radio operators are not always available for use in their primary duties because of mess duty, guard, hospitalized, leave, etc. Conservatively, 18 radio operators are required for operations in the battalion headquarters (less air and other supporting arm nets) and for operation of the tactical net at company level. Thus, the proposal leaves a shortfall of 5 radio operators. Reductions based on MTACCS should not be considered valid until the system and its various subsystems have been fully tested and implemented in the field.

h. Reduction in Number of Wiremen. The proposed battalion stucture "C" would reduce the battalion wire section by 6 personnel. However, the study points out that MTACCS will increase wiring requirements. Of the 13 wiremen, 5 are assigned to the mortar support section, leaving only 8 for the battalion headquarters. The above cut of 6 wiremen appears to have been an arbitrary one, as no rationale is provided. The installation and maintenance of the battalion wire system requires, at a minimum, three two-man wire teams and a three man switchboard section. This does not take into account the wire chief, personnel needed during displacement, or extra wire teams needed for special circumstances. Nor will this reduction provide sufficient personnel to properly maintain or transport all of the battalion wire equipment. By operating with only three two-man teams the installation of the CP wire system will be slowed down considerably; with fewer personnel, it will be slowed to the point of unresponsiveness to mission requirements. Again, as with the radio section, it should not be assumed that all wire personnel will be available for use in their primary duties at all times, thus further degrading the battalion's ability to operate a viable wire system. The strength of the wire section should not be reduced without greater justification than is provided by this study.

i. Reduction of Communications Equipment Maintenance Capability. Again, as in the radio section, a required capability is being lost and justified as "minor". The proposed infantry battalion stucture "C" would reduce the radio maintenance capability of the battalion by one radio technician (MOS 2861) and one radio repairman (MOS 2841) without any concurrent reduction in equipment density. The loss is justified by the statement "in anticipation of future MTACCS requirements". This reduction will result in a 50% degradation in the infantry battalion's radio equipment maintenance capability. It should also be pointed out that the study incorrectly lists the "I" series T/O MOS 2884 strength as two vice one. Radio technicians and repairmen billets should not be deleted until MTACCS is completely functional and the advertised reduction in radio equipment is realized.

j. Reduction in Number of Cooks. The authorized ratio of cooks has not changed in the last 25 years. However, during the last 10 years alone, tasking for cooks (principally in the areas of garrison feeding and DOD master menu requirements) have increased substantially. The Marine Corps has recently submitted, and had included in POM 82, a request which would increase the number of cooks at the infantry battalion level by five (Cpl-Pvt). Even with the decrease from "M" to "X" to "I" series T/O, the workload for food service personnel in garrison has not dropped. Therefore, the loss of 3 cooks (MOS 3371) from the present infantry battalion structure should not be permitted and would, in fact, be counterproductive to staff work that has been accomplished at HQMC level.

k. STA Platoon Manning/Assets

(1) Structures A, B, and C of the draft Infantry Battalion Structure Study, 1980-1990 do not furnish an adequate response to

the near term threat in providing a sufficient surveillance capability for the Marine infantry battalion. Each structure provides only 9 enlisted Marines. This is sufficient personnel to man the 4 AN/TVS-4 night observation devices (NOD) and 2 of the 8 AN/PPS-15 ground surveillance radars. None of the structures provides for scout/snipers except as an additional duty for the two company messengers in each rifle company.

(2) The Marine infantry battalion, by doctrine (FMFM 2-2), is responsible for close reconnaissance and surveillance in its zone from the FEBA forward to the coordinated fire line (CFL). Ground surveillance radars, NODs, and scout/snipers provide these functions to the forward deployed rifle companies as a reinforcement to the company's own local security. Just as an M-16 rifle is issued to an individual rifleman or a machinegun to the gunner for training, employment, and operator maintenance purposes, a specific ground surveillance radar or sniper rifle should be "issued" to an assigned operator for training, employment, and operator maintenance purposes. If the ground surveillance radar and scout/sniper concept are to be fully effective then these teams must train for their job and to employ their tools/weapons. A Marine whose primary duty is messenger for the rifle company headquarters or some other job within a rifle company will not be as well trained/capable as a full time radar operator or scout/sniper. Likewise, these teams/individuals should receive centralized, specialized training not part time training when they can be made available from their other duties.

(3) Ground surveillance radars, NODs, and sniper rifles should be located, manned, and employed under the cognizance of the battalion S-2 in the STA platoon for maximum efficiency and effect. If it is absolutely necessary to reduce the level of STA platoon manning below that required to operate and maintain all assigned equipment, spaces should be provided for the required personnel as contingency billets and excess equipment should be turned in for maintenance at a higher lever. The capabilities or potential effectiveness of STA platoon should not be diluted by saddling it with excess equipment which must be maintained at the expense of training or with a shortfall in manning so that the equipment must be used by part time operators.

2. Recommendations

a. That the billet of motor transport officer be retained in the Marine infantry battalion structure for the 1980's.

b. That the T/O grade for the XO of the combined arms company and the XO of the special infantry troop be switched and the title of the special infantry troop XO be changed to commander. That the billet of special infantry troop first sergeant be deleted.

c. That the billet of platoon guide be retained in the rifle company structure and added to the platoons of the special infantry troop.

d. That the billet of H&S company supply sergeant should be retained in the H&S company structure.

e. That the table of organization for supply personnel within the infantry battalion not be reduced without a proportionate reduction in the amount and types of equipment to be supported.

f. That the five 0151 administative clerks designated in the infantry battalion structure reorganization for transfer to company offices be retained in the battalion administration center where their talents will be more effectively utilized.

g. That the number of radio operators, wiremen, and radio technicians/repairmen in the infantry battalion not be reduced until MTACCS is fully operational and has clearly demonstrated that the billets are not required.

h. That the number of cooks in the infantry battalion be maintained at the level envisioned by POM 82.

i. That one of the following courses of action with regard to manning/equipping the STA platoon be adopted:

(1) Provide personnel (T/O spaces) so that all equipment (8 AN/PPS-15s, 4 AN/TVS-4s, 8 Sniper Rifles) can be manned.

(2) Turn in excess equipment so that only equipment for which personnel (T/O spaces) are provided is on the battalion's allowance list.

1. Discussion. Throughout this report, reference is made to the necessity to decentralize weapons and equipment to the infantry battalion and company level. The rationalization for this move is that decentralization of weapons and equipment will lead to earlier engagement of the "threat" than would be the case if weapons and equipment were located at some intermediate or higher level of command and control. This logic fails to take into account that each time a Marine force is task organized with a certain mission in mind that force (MAGTF) is task organized before the battle to defeat the threat for that specific mission. Just because the threat for a significant portion of involvements since World War II has been against Soviet or Soviet model forces does not mean that the Marine infantry battalion must be organically organized to defeat that "threat". Certainly the Marine infantry battlion must train to defeat that "threat" but it must also train (and be organized) so that it can be readily task organized to defeat other threats. The organization of the Marine infantry battalion should be designed to be the basic building block to which other forces can be added (task organized) as necessary to counter and defeat a specific threat, whatever it may be. Training is the means by which these task organized forces prepare to meet a specific threat; if a significant percentage of the threat is Soviet or Soviet model, then a significant percentage of training should be done with units task organized to counter and defeat that threat. This does not mean that the training unit should be organized as a Marine infantry battalion: --it should be task organized to counter and destroy the specific threat. An approach called "differentation-integration organizational design" could be used to design this standard Marine infantry battalion as a basic building block to be task organized, as necessary, as part of a MAGTF. This design approach requires the analyst to define precisely the environment within which the organization is to operate and in the context of that environment to define the functions the organization must perform to accomplish its mission(s). Once the functions have been defined, the analyst designs a separate organization to accomplish each different function. This is the "differentation". Then the analyst designs a superstructure of command and control, and uses other techniques as well, to integrate the different "functional" organizations into a balanced organization capable of doing the functions in a coordinated way that accomplishes the mission. This is the "integration". The desired result is an organization that provides coordinated response to the functional demands of the environment and the mission.

2. Recommendation. That care be exercised to ensure that the final Marine infantry battalion selected is the basic building block which is neither too heavy nor too light; which contains sufficient command and control, administrative, and logistical personnel and equipment to support the organization; and which can be easily and effectively task organized as necessary to accomplish its assigned mission, as part of a larger force (MAGTF).

ENCLOSURE (2)

ORGANIC VERSUS TASK ORGANIZED TOWS AND DRAGONS

1. Discussion.

a. In the preferred structure (structure C), the study recommends that a squad of Dragons (3 trackers) be organically assigned to the weapons platoon of each rifle company and that a section of TOWs (8 launchers) be organically assigned to the antiarmor platoon of weapons company. These TOWs would be in addition to the 72 launchers already located in the AT (TOW) Company of the tank battalion. The rationale for this organization is that there will not be sufficient time to task organize once the battle has begun. An opposite view to the above train of logic is that decentralization of these important weapon systems is a sure way to lose the battle because by being decentralized they are not readily available to be task organized to weight the attack or the defense. From the point of view of training and maintenance, centralization of assets would provide for concentrated management of several similar sections (Dragons or TOWs) by the platoon staff (platoon commander, platoon sergeant, and section leaders) working together. When Dragons are somewhat decentralized into the weapons platoons and the TOWs are a part of an antiarmor platoon in weapons company, the platoon staff has several weapons systems to work with and cannot concentrate on any one system. Also, there is no TOW technician located at the battalion to perform the routine calibration required on the TOW launchers prior to training.

b. As a solution to the centralization/decentralization issue in structure C, it is proposed that the antiarmor platoon in the weapons company be equipped with 32 day and 32 night Dragon trackers to provide direct support for rifle companies and also to provide additional general support for the infantry battalion. The TOWs should be centralized in an antiarmor platoon (24 launchers, 3 sections) in headquarters company of the infantry regiment to include a TOW technician with necessary test equipment. In this manner, both the regimental and battalion commanders can weight the attack or defense by task organizing their forces in responce to the threat before the battle (not after the battle has begun). If it is necessary to change the task organization during the battle the distance would not be so great that the battle would be lost; the assets to be moved are at most one level up in the chain of command, and these changes should be covered by "on order" missions. Command and control, training, and maintenance would all benefit because of the centralization of expertise at the platoon level.

2. Recommendation. That TOW and Dragon assets be organized into antiarmor platoons at the regimental and battalion levels respectively.

1. Discussion. Statements/logic used in the analysis of indirect fire weapons and subsequent selection of a dual weapon mortar platoon are questioned.

a. The conclusion that the 60mm LWCMS is more lethal based on sustained rate of fire is not questioned; however, the practicality/feasibility of providing enough ammo to make this conclusion a reality is challenged. 20 rds/min for 6 tubes compared to eight rds/min for four tubes (2 Sec LWCMS vs 2 Sec 81mm mortar) results in a 3.75:1 ratio of ammo expenditure. Further, the ability of the infantry battalion to carry enough ammo to use the sustained rate of fire lethality comparison as a basis for favoring the LWCMS is challenged.

b. The comparison of the 8-tube 81mm mortar platoon (Structure B/"I" T/O) to the dual weapon mortar platoon (Structure A/C) should be reexamined. 81mm mortar sections in structure B are carried at 19 men per section with a 2/4 man platoon headquarters. 81mm mortar sections in the dual mortar platoon are carried at 15 men per section with a 1/2 man platoon headquarters. The LWCMS sections in the weapons company do not provide for FO teams/section headquarters as in the 81mm mortar sections; similar section headquarters would surely be required if the LWCMS is to be used in the same manner as 81mm mortars. When 81mm mortar sections and platoon headquarters in structure B are reduced to the same size as those in structure C and when FOs and section headquarters are added to the LWCMS sections, the difference in platoon size for the two structures is reduced to one or two men.

c. Mixing mortar systems within the weapons company mortar platoon could lead to confusion and dangerous safety considerations. There would probably be a requirement for two separate sections to compute firing data and two gun loops. There would be problems working with two calibers of ammo. There would be training and maintenance problems.

d. Lastly, the XM224 60mm LWCMS is a new, as yet untried, weapon system. A more cautious approach to testing this weapon would be to replace the M19 60mm mortar with this weapon initially. After it has proven itself at the company level, after new, longer range WP and illumination rounds have been developed, and after it has been tested at battalion level, the Marine Corps could consider replacing the 81mm mortar with this new system.

2. Recommendation. That eight M29 81mm mortars be retained in the mortar platoon of the combined arms company vice the dual weapon mortar platoon as recommended in structure C of the Infantry Battalion Structure Study.

STRUCTURE "C MODIFIED"

	Structure C		Structure C Mod
Inf Bn	47/869		48/869
H&S Co	20/154		21/180
Add Co Supply Sgt (0311)	0/1		
Add 2 Messenger/Driver (0311)	0/2		
Add 5 Admin Clerks (0151)	0/5	(from Co HQ)	
Add 4 Radio Ops (2531)	0/4		
Add 6 Wiremen (2512)	0/6		
Add 1 Radio Rprman (2841)	0/1		
Add 1 MTO (3502)	1/0		
Add 3 Supply Admin Men (3043)	0/3		
Add 1 General Warehouseman (3051)	0/1		
Add 3 Cooks (3371)	0/3		
Net Change	1/26		
Ch 1 Grd Radar Rprman (2884) to Radio Tech (2861)			
Combined Arms Co	9/262		9/248
Delete Sp Inf Trp 1stSgt (9999)	(0/1)		
Delete Admin Clerk (0151)	(0/2)	(to H&S Co)	
Delete Hvy MG Sec (0331)	(0/1)		
(0369)	(0/1)		
Delete Admin TOW Sec (0352)	(0/20)		
(0369)	(0/1)		
Delete 2 LWCMS Sec (0341)	(0/20)		
Add 2 81mm Mort Sec (0341)	0/28		
(0369)	0/2		
Add 8 Dragon Tms (0352)	0/16		
Add 3 Plat Guides (0311)	0/3		
Net Change	(0/14)		
Ch Sp Inf Trp XO (Lt)(0302) to Sp Inf Trp Comdr (Capt)(0302)			
Ch Combined Arms Co XO from Capt (0302) to Lt (0302)			
Rifle Co X3	6/151		6/156
Delete Admin Clerk (0151)	(0/1)	(to H&S Co)	
Delete Antiarmor Sqd (0352)	(0/7)		
Add Plat Guides (0311)	0/3		
Add LWCMS Sqd (0341)	0/3		
Add Machinegun Sqd (0331)	0/7		
Net Change	0/5		

STRUCTURE "A MODIFIED"

	Structure A	Structure A Mod
Inf Bn	48/868	49/899
H&S Co	20/154	21/179
Add Co Supply Sgt (0311)	0/1	
Add 2 Messenger/Driver (0311)	0/2	
Add 4 Admin Clerks (0151)	0/4 (from Co HQ)	
Add 4 Radio Ops (2531)	0/4	
Add 6 Wiremen (2512)	0/6	
Add 1 Radio Rprman (2841)	0/1	
Add 1 MTO (3502)	1/0	
Add 3 Supply Admin Man (3043)	0/3	
Add 1 General Warehouseman (3051)	0/1	
Add 3 Cooks (3371)	0/3	
Net Change	1/25	
Ch 1 Grd Radar Rprman (2884) to Radio Tech (2861)		
Weapons Co	4/110	4/136
Delete 2 LWCMS Sec (0341)	(0/20)	
Add 2 81mm Mort Sec (0341)	0/28	
(0369)	0/2	
Add 8 Dragon Tms (0352)	0/16	
Net Change	0/26	
Rifle Co X4	6/151	6/146
Delete Admin Clerk (0151)	(0/1)	
Delete Antiarmor Sqd (0352)	(0/7)	
Add Plat Guides (0311)	0/3	
Net Change	(0/5)	

Comments of Commanding General, 4th Marine Division

(Rein), Fleet Marine Forces, USMCR

UNITED STATES MARINE CORPS
4TH MARINE DIVISION (REIN), FMF, USMCR
4400 DAUPHINE STREET
NEW ORLEANS, LOUISIANA 70146

IN REPLY REFER TO
5:LBM:rmd
15 May 1980

From: Commanding General
To: Commanding General, Marine Corps Development and Education Command, Quantico, Virginia 22134

Subj: Marine Infantry Battalion Structure 1980-1990

Ref: (a) Draft Report on the Marine Infantry Battalion 1980-1990, D 032/LES/jah 3900 dtd 18Apr80

1. Reference (a) has been reviewed by this Headquarters as requested. The subject study is detailed and technical in nature, and it is readily apparent that many hours of research were dedicated in order to arrive at the final conclusion and recommendations presented. The comments provided in subsequent paragraphs address the impact the candidate structures will have on the 4th Marine Division if adopted, as well as recommendations considered germane to improvement of the proposed structures.

a. The adoption of candidate structures A or C would present the least amount of organizational turbulence within the 4th Marine Division. Both of these structures contain four infantry maneuver elements. The 4th Marine Division has retained the four rifle company configuration during the development of the study and did not adopt the I or X series T/O.

b. Structure B would cause the greatest amount of organizational turbulence. Organizational changes for Reserve units are constrained by geographic factors. We cannot move people around to occupy new structural organizations. In order to fit into a 3 rifle company structure, it would be necessary to redesignate one rifle company per battalion. Assuming that infantry units are retained as infantry, these redesignated units would become detachments of understrength rifle companies which would themselves be redesignated as the company(-). In certain cases, rifle companies would be located at three separate training centers as a company(-) with 2 detachments. This arrangement would tend to degrade unit readiness.

c. The discussion concerning C^2 (hence, the communications structure) centered primarily around the impact the Marine Tactical Command and Control System (MTACCS) would have on any of the alternative structures. In this regard, the viewpoints

ADC 80
BT. NO. 1866

of the panel members contained in Section V of the subject study, specifically page V-26, is particularly cogent. The study has demonstrated that mobility equates to less attrition of the battalion's resources. Accordingly, how far down in the infantry battalion structure MTACCS is placed, given the increased skill level/maintainability/greater poundage required versus "real-time information" capability, should be the subject of critical study/review.

d. The reduction of 11 to 12 billets from the present communication platoon structure ("I" series T/O) of the H&S company for the three proposed structures is viewed with skepticism. Implied within the justification given for the reduction is that automation is going to save people. The truth is that automation gives one "more information", not a personnel savings. The majority of the billet deletions were wiremen, which are short-sighted since wire/fiber optic cable could become a very viable alternate means of communications that can overcome the postulated electronic warfare threat while insuring reliable communications.

e. The rank of captain for the company commander of the combined arms company in structure C is non-concurred with. It is recommended this billet be a major and also that the executive officer not be double-hatted as the special infantry troop commander. This would require the addition of another officer for the special infantry troop. A major would provide the combined arms company the experience level needed to properly command such a diversified, equipment oriented unit. The permanent executive officer is considered an absolute necessity for the combined arms company. Worst case would be in a combat situation with the combined arms company commander acting as the battalion FSC, the special infantry troop being utilized as a maneuver element, and the mortar, anti-armor and heavy machine gun sections in general support. A permanent executive officer could be the leader needed to keep those sections in general support functioning properly at a most critical time.

f. The battalion sergeant major should not be double hatted as the battalion career planner. Both of those jobs are full-time jobs that require full-time workers. The sergeant major is too busy with the needs of a 900 men battalion, and the career planner requires an exceptionally good sergeant working full-time to retain the good Marines in the Marine Corps.

g. In the discussion of tactical mobility, the study addresses helicopter loading as a simple arithmetic function. It fails to address unit integrity. More thought and planning consideration must be given to the utilization of equipment on hand and equipment slated for the inventory in the foreseeable future.

5:LBM:rmd
15 May 1980

h. In the Analysis of Air Defense Weapons, the study makes a case for the inclusion of anti-air systems in the battalion structure. The case is then softened by the statement that the "...placement of anti-air systems at some organizational position within the division, but not in the infantry battalion, is a suitable alternative." The study, in effect, opens the door but doesn't follow up with a definative statement of how the command and control systems could handle an air threat passed from long range by the air control squadron to intermediate range by the LAAMS battalion thence to a unit out of the air structure---the infantry battalion or other division organization.

i. It is understood that the subject study was conducted utilizing only a general logistics appraisal; however, it is strongly recommended that a follow up analysis be conducted prior to the establishment of the approved structure. Of paramount concern are the personnel requirements (technicians, mechanics, logisticians) for the headquarters and service company of the infantry battalion necessary to support the increases in the weapons system and the new series of motor transport assets. The necessary changes in intermediate support organizations, while of equal concern, could possibly be delayed until after the approved infantry structure is established.

2. In regards to the timing of the new structure being adopted by the Reserve force, options should be developed to phase the new structure into our present arrangement. A window or a time sequence in which to make the switch must be provided so that there is some flexibility to retrain, reequip, and manage manpower changes without suffering a reduction in our readiness position.

Marc A. MOORE

Comments of Commanding General, 1st Marine Division (Rein),

Fleet Marine Forces, Pacific

CAMP PENDLETON, CALIFORNIA, 92055

IN REPLY REFER TO:
3/CAB/jma
3900
3 JUN 1980

From: Commanding General
To: Commanding General, Marine Corps Development and Education Command, Quantico, Va 22134

Subj: Marine Infantry Battalion Structure 1980-1990

Ref: (a) CG, MCDEC ltr D032/LES/jah over 3900 dtd 18 April 80
(b) Ponecon between Col BARSTOW (G-3, 1st MarDiv) and LtCol SHAW (Force Structure Study Group, MCDEC) of 30 May 80
(c) CG, FMFPac 0717322 May 80 (NOTAL)

1. As requested by reference (a), the draft "Marine Infantry Battalion 1980-1990" has been reviewed. Reference (b) granted an extension until 6 June 1980. General and specific comments are provided herein.

2. General

a. Review of the draft report has identified general as well as detailed comments. These general comments have been included in order to address broad areas of concern in the overall structure. They attempt to relate the recommended structure to the reality of the Fleet Marine Force, and to identify anticipated problems should the new structure be implemented. In so doing, the realities of manpower constraints and the guidance to the study group were considered. The new structure, regardless of the magnitude of change, will have an impact on unit deployment, MTPS planning, training, and operations at a time when funding is decreasing.

b. While most of our time is spent in garrison, we recognize our structure is oriented to combat employment. Thus, the flexibility built into our tables of organization has traditionally, and wisely, recognized garrison requirements including training. We know however, that the flexibility has also accommodated our unique combat requirements. The austere character of the proprosed structure significantly reduces that flexibility. An overall reduction in personnel, when combined with an increase in weapons and major equipment, would significaltly increase the maintenance effort of the battalion. Shortages in critical skills and grades will probably not be alleviated with a reduction in manning; in fact, the problem can be expected to be exacerbated. The below comments reflect some of the problems which can be anticipated, and should be considered, prior to implementation of a new structure:

(1) Area, or base support, functions are implicit in garrison. These include, but are not limited to, operating and maintaining barracks, providing and administering extensive special services functions, operating mess halls, providing physical security, providing assistance to bases (Fleet Assistance Program(FAP)), area and grounds maintenance, operating garrison mobile equipment (GME) on loan to tenant FMF organizations, operating a Division Schools organization of varying magnitude, clubs, human affairs, and non-T/O billets, e.g., drug and alcohol abatement, career planners at unit level. Few, if any, will be reduced in magnitude or in personnel requirements as a result of reductions in organizational strengths.

(2) Concomitantly, the reduction in structure strength can only result in fewer Marines available for training. Funded at a specific readiness level, and manned accordingly, the reduction in squad, platoon, and company strengths will be reflected in a significant decrease in Marines available for training, as well as more austere manning of crew-served weapons. With the increase in crew-served weapons, and the commensurate increase in ammunition requirements, smaller crews will have difficulty handling ammunition. Further, any increase in ammunition will have a serious impact on LFORM ammunition and basic allowance stocks to be embarked in amphibious shipping, which are presently operating with smaller ship squadrons than in the past.

(3) The elimination of the Career Planner billet, if accompanied by a change in policy regarding the Career Planning Program, would be acceptable. The retention of the function, however, and its assignment to the battalion Sergeant Major, is unrealistic. The Sergeant Major performs an important leadership function which would be seriously degraded if he were to be assigned an additional duty which is performed, on a full-time basis, by a staff non-commissioned officer in most organizations (battalion level and above) and a non-commissioned officer in units below the battalion level.

(4) Reductions in maintenance and supervisory personnel in critical areas (e.g., motor transport, food services, maintenance management, supply, guides in rifle platoons, and communications) will have a serious impact on the commanding officer's ability to maintain readiness.

within the structure, then from necessity. Almost every billet that has been eliminated, in addition to many that are not recognized, will have to be manned in garrison. Many, such as platoon guides and ammunition carriers, will have to be manned in combat as well. This is a fact of life that must be considered.

3. Detailed comments and recommendations are as follows:

a. Combined Arms Company

(1) ITEM: TOW SECTION

Comment: Tactically, the inclusion of one TOW section is a welcome addition to the infantry battalion's arsenal. However, this weapon system presents logistical concerns which should be addressed in a detailed logistical supportability analysis. Reference (c), FMFPac input to the annual TOW system assessment program, addresses logistic and maintenance problem areas inherent in the TOW system. The TOW assessment program can serve as a starting point and should be analyzed before further consideration is given to providing TOW weapons to an infantry battalion. A copy of reference (c) is attached for information.

Recommendation: That a detailed logistical supportability analysis be conducted.

(2) Item: Special Infantry Troop

Comment: Although the establishment of a fourth maneuver element is sound, the placement of the Special Infantry Troop within the Combined Arms Company structure is awkward. The possibility of using this ready manpower pool for such internal functions as CP security would seriously detract from its primary mission. Additionally, its relatively small size will reduce its intended effectiveness. If a fourth rifle company cannot be accommodated, larger three company battalions would be more acceptable than the infantry troop concept. This would permit meaningful training.

Recommendation: That the placement of the fourth maneuver element outside of the Combined Arms Company umbrella be considered. The responsibilities of the company, in actuality a weapons unit, are already great without adding the responsibilities of a rifle unit.

(3) Item: Combined Arms Company Executive Officer

Comment: For one individual to serve as the XO for the 262-man company and as the CO for the 110-man Special Infantry Troop within that company does not do justice to either billet and is unrealistic. There are sufficient responsibilities and duties inherent in each position to warrant the assignment of separate individuals. It would appear that the Special Infantry Troop was structured merely to use the company XO as its CO. The function of this officer in combat is more likely to be in demand as a COC watch officer. Further, to have two commanding officers in one company, both (probably) with Article 15 authority, and both theoretically involved in the administration of discipline at both levels, is unprecedented and unworkable. Many lieutenants become company commanders by necessity, but our tables of organizations have properly prescribed captains.

Recommendation: That the Executive Officer, Combined Arms Company and the Commanding Officer, Special Infantry Troop be separate T/O billets if this unit should be approved for implementation.

(4) Item: Mortar Platoon

Comments: The concept of a combined mortar platoon poses several problems.

(a) The three man LWCMS squad can only carry a limited amount of ammunition (strictly a foot mobile situation). Whereas in the rifle company, the additional mortar rounds can be spread-loaded, this is not possible in the mortar platoon, unless, of course, the Special Infantry Troop is used. However, to saddle the Special Infantry Troop with this task only serves to further strap that unit to the Combined Arms Company and thereby limit its employment as a maneuver element.

(b) Despite the fact that the response to question C.2.1 on page IV-44 indicated concensus with the need for a dedicated FDC for the mortar platoon, no allowance has been made in the T/O to support this need. Additionally, an FDC for two dissimilar mortar systems would require manning two separate plotting boards.

Recommendation: That the concept of a combined mortar platoon be reexamined.

b. Headquarters and Service Company

(1) Item: Company Commander, H&S Company

Comment: Do not concur with the suggestion that the grade requirement for the CO may be reduced to that of lieutenant. This officer's function as Headquarters Commandant deserves and

Recommendation: That the T/O billet of Commanding Officer, H&S Company be a captain.

(2) Item: Administrative Clerk, H&S Company

Comment: The H&S Company has a need for an administrative clerk, just as does each rifle company the Combined Arms Company, and the Special Infantry Troop. The reduced S-1/Adjutant section will not be capable of providing adequate administrative support to the H&S Company and continue to carry out their primary function.

Recommendation: Include an Administrative Clerk (0151) billet within the T/O for Company Headquarters, H&S Company.

(3) Item: Logistics Chief, S-4 Section

Comment: Although commodity areas within the logistics area have personnel assigned (maintenance management, embarkation, ammo), the principal staff officer needs an assistant, preferably a Gunnery Sergeant as Logistics Chief.

Recommendation: That the T/O include a Logistics Chief billet.

(4) Item: Bachelor Housing Enlisted Personnel (BHEP) Management

Comment: The [illegible]on requires a dedicated individual, preferably a SNCO, [illegible]perly and efficiently manage its BHEP assets. Recognizing that this is a garrison requirement, the billet is of such significance that it should be included in the T/O. A dual role for this individual in a combat environment should be sought.

Recommendation: That a billet for a BHEP SNCO be included in the S-4 section T/O.

(5) Item: Maintenance Management, S-4 Section

Comment: The billet for a SSgt Maintenance Management Chief is unnecessary. However, to satisfy MIMMS requirements, two clerks, one being a Cpl/Sgt, are necessary.

Recommendation: That the Maintenance Management assets within the S-4 section be reexamined.

(6) Item: Armorers

Comment: The increase in weapons types and numbers is not accompanied by an appropriate increase in the number of armorers.

Recommendation: That the armorer requirement for the new Marine Infantry Battalion structure be reexamined.

(7) Item: Motor Transport

Comment: The deletion of the Motor Transport Officer billet is unrealistic, especially with the increase in MT assets incumbent with the new TOW section in the antiarmor platoon. Similarly, there is no increase in the number of auto mechanics.

Recommendation: That the Service Platoon, H&S Company T/O include a Motor Transport Officer and two additional auto mechanics.

(8) Item: Career Planner

Comment: Deletion of the Career Planner's billet is not realistic given the challenges and pressures that higher headquarters exerts for greater reenlistment percentages. Although the Sergeant Major may assume responsibility for career planning, the requirement for a full-time, dedicated Career Planner still exists.

Recommendation: That the T/O include the Career

Planner (8421) billet.

(9) Item: Communications Platoon

Comment: The reduction in the number of radio repairmen is unwarranted. In fact, the eventual implementation of MTACCS will increase communication maintenance requirements. The personnel assets needed to meet these requirements should be anticipated.

Recommendation: That the Communications Platoon T/O reflect two radio repairmen vice one.

c. Command and Control

(1) Item: MTACCS

Comment: Concur in the study's assessment of MIFASS and TCO's potential worth and drawbacks.

Recommendation: That a reexamination of each developing MTACCS subsystem be conducted as proposed by the Infantry Battalion Study Advisory Panel.

4. The thrust of the study appears to have been the tactical configuration and weaponry required to meet the probable threat during the 1980-1990 time frame. However, two additional important aspects need to be considered:

a. The logistical supportability of the infantry battalion structure, particularly in the areas of crew-served weapons, motor transport, and communications equipment, needs to be closely scrutinized.

b. The day-to-day, practical realities of an infantry battalion functioning in today's environment must be incorporated into the structure. Sufficient personnel and equipment must be provided so that, not only does the organization possess the desired combat capability, but such that it can also adequately function while in a garrison. To ignore this requirement would be very imprudent.

5. In summary, this command views the proposed structure with concern. If manpower constraints are anticipated to be of such magnitude as are indicated by the study, vertical vice horizontal cuts should be considered. In this way, effective training can be conducted by battalions manned to accomplish necessary garrison and combat functions. Cadred battalions could be mobilized by moving en masse, half of each fully manned battalion. By utilizing either of these two options real readiness could be achieved and maintained.

Comments of Commanding General, Landing Force Training Command, Atlantic

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Quantico, Virginia 22134
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Subj: Marine Infantry Battalion Structure 1980-1990

Ref: (a) MCDEC ltr D 032/LES/jah 3900 of 18 Apr 80 w/encl
(b) FONECON btwn Asst Dir Trng LFTC and MCDEC, Code D 032 of 25 May 80

1. Reference (a) provides subject study and requested review. Reference (b) extended review completion date due to delayed receipt of study at this command.

2. As requested by reference (a) subject study has been extensively reviewed and is concurred in.

J. B. HARRIS
By direction

Fold

COPY TO

From:
Commanding General
Landing Force Training Command, Atlantic
Naval Amphibious Base, Little Creek
Norfolk, Virginia 23521

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Comments of Commanding General, 1st Marine Brigade,

Fleet Marine Forces, Pacific

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FOR FORCE STUDY GROUP, DEV CTR

SUBJ: MARINE INFANTRY BATTALION STRUCTURE 1980-1990

A. CMC WASHINGTON DC 090916Z MAY 79

B. CG MCDEC LTR 0 032/LES/JAH 3900 DTD 19 APR 80

1. THE FOLLOWING COMMENTS ARE OFFERED PER THE REFS:

A. MISUSE OF THE SPECIAL INFANTRY TROOP AS PERMANENT BATTALION RESERVE AND THE GARRISON WORKING PARTY IS A DISTINCT POSSIBILITY.

B. INCREASED WEAPONS, VEHICLES AND SPECIALIZED END ITEMS IN STRUCTURE C MAY REQUIRE FUTURE ADDITIONAL TECHNICAL MOS'S FOR SUPPORT.

(1) MOTOR TRANSPORT ROLLING STOCK IS INCREASED WITH NO ADDITIONAL MECHANICS WHILE MTO IS DELETED.

(2) AMOUNTS/TYPES OF WEAPONS ARE INCREASED WHILE

PAGE 02 RUHQSGS5164 UNCLAS

ARMORERS/AMMO TECHS ARE SPARSE.

(3) INCREASED LOGISTICS REQUIREMENTS WITHOUT DESIGNATED LOGISTICS CHIEF.

C. MOUNTING M2 MG ON ORGANIC ASSETS WILL TAX SMALL MT SECTION. SPECIFIC VEHICLES SHOULD BE CONSIDERED AS PRIME MOVERS.

D. EARLY-ON ASSESSMENT SHOULD BE MADE TO TIE IN WITH LIFT REQUIREMENTS OF HELO COMMUNITY OF 1980-1990, TO INCLUDE INCREASED PROCUREMENT IF REQUIRED.

2. TECHNOLOGICAL INCREASES IN COMMAND CONTROL SYSTEMS, ADVANCED WEAPONRY, SOPHISTICATED COMMUNICATIONS WILL REQUIRE BASIC MARINE OPERATOR TO BE EXTREMELY COMPETENT AND DEMAND CORRESPONDING TRAINING, LEADERSHIP, AND PERSONAL RENUMERATIONS. THE PRICE WILL BE HIGH FOR THE FUTURE MARINE TO OPERATE ON A MODERN BATTLEFIELD.

3. LATE RECEIPT PRECLUDED IN-DEPTH ANALYSIS.

BT

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MINN

Comments of Commanding General, Landing Force

Training Command, Pacific

C/S X ADJ X FAC LOPS HMPWR PSERV SJA COMPT SUPPLY MNSYS CMCC
MOEN SPTBN SCTYBN WTBN MSGBN HQMCI DENTAL MCAF X HMX USAF
DEVCEN A MCOTEA X ARRIVAL EDCEN OCS TBS SPTDIV ROICC CHAP NIS
OPDO FBIACAD LAMCROSS MCX OMU COMMO GMF CNDFILE W/SUPVR 3

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TO CG MCDEC QUANTICO VA
BT
UNCLAS //N03900//
SUBJ: MARINE INFANTRY BATTALION STRUCTURE 1980-1990
A. CG MCDEC LTR D 032/LES/JAH 3900 OF 18 APR 1980
B. DRAFT REPORT ON THE MARINE INFANTRY BATTALION 1980-1990
1. IN RESPONSE TO REF A, FOLLOWING COMMENTS AND RECOMMENDATIONS CONCERNING REF B ARE SUBMITTED.

A. ITEM: DUAL ROLES REQUIRED OF OFFICERS IN THE COMBINED ARMS COMPANY IN STRUCTURE C.

DISCUSSION: FOUR JOBS (COMPANY CO, COMPANY XO, FSC, AND SPECIAL INFANTRY TROOP CDR) ARE FILLED BY TWO OFFICERS (COMPANY CO AND COMPANY XO) DURING COMBAT OPERATIONS. EACH JOB BY ITSELF REQUIRES FULLTIME ASSIGNMENT OF AN OFFICER. THEREFORE, PROPOSAL DOES NOT APPEAR A REALISTIC METHOD OF MEETING MANPOWER CONSTRAINTS.

RECOMMENDATION: THAT A CAPTAIN 0302 BE ASSIGNED AS SPECIAL INFANTRY TROOP CDR AND THAT THE COMPANY OPERATIONS OFFICER BE REDESIGNATED THE COMPANY XO.

B. ITEM: REDUCTION OF TWO 81 MM MORTAR FO'S AS RESULT OF DELETION OF TWO MORTAR SECTIONS FROM MORTAR PLATOON IN STRUCTURE C.

DISCUSSION: BECAUSE OF THE TEMPO OF COMBAT OPERATIONS AND NUMEROUS ACTIVITIES OCCURRING AT THE COMPANY COMMAND LEVEL IN COMBAT, THE COMPANY CDR NEEDS AN 81 MM MORTAR FO TO PLAN AND CALL FIRES, AS DIRECTED, ON THE DEDICATED MORTAR RADIO NET. THE COMPANY CDR DOES NOT HAVE TIME TO PLACE FIRE MISSIONS HIMSELF, NOR DOES TIME ALLOW THE RELAYING OF A CALL FOR FIRE THROUGH THE BATTALION FSCC OR FDC IF THE BN TAC NET HAD TO BE USED.

RECOMMENDATION: THAT A TOTAL OF FOUR 81 MM MORTAR FO TEAMS BE STRUCTURED INTO THE MORTAR PLATOON.

C. ITEM: MORTAR WEAPONS MIX IN MORTAR PLATOON, STRUCTURE C.

DISCUSSION: THE COMBINATION OF MORTAR TYPES WITHIN THE MORTAR PLATOON CREATES CONCERNS. DIFFERENCES IN TRAINING, SQUAD AND SECTION ORGANIZATION, AMMO TYPE, MAINTENANCE, AND PARTS COULD BE PROBLEMS AS COULD FIRING DATA DIFFERENCES IN FDC OPERATIONS.

RECOMMENDATION: EQUIP THE MORTAR PLATOON WITH ONLY ONE TYPE OF MORTAR.

D. ITEM: HEAVY MACHINE GUN SECTION.

DISCUSSION: THE VIABILITY OF THE 50 CAL MG IN AN AIR

PAGE 03 PUNOSGG6335 UNCLAS
DEFENSE ROLE IS SUSPECT, PARTICULARLY IN CONSIDERATION OF ITS LIMITATIONS AGAINST ATTACK HELICOPTER AND PROBLEMS ASSOCIATED WITH FIRE COORDINATION AND CONTROL.

RECOMMENDATION: THAT AIR DEFENSE NOT BE STATED AS A PRIMARY MISSION.

E. ITEM: REDUCTION OF FOUR RADIO OPERATORS WITHIN THE BATTALION, STRUCTURE C.

DISCUSSION: IN VIEW OF THE EW THREAT, TRAINED MOS 2531 FIELD RADIO OPERATORS ARE REQUIRED AT COMPANY LEVEL. THE REDUCTION WOULD RESULT IN LOSS OF THESE OPERATORS FROM THE RIFLE COMPANIES (SPEC INF IP).

RECOMMENDATION: THAT 40 MOS 2531 RADIO OPERATORS BE RETAINED IN THE BATTALION.

F. ITEM: SPECIAL INFANTRY TROOP (SIT)

DISCUSSION: CREATION OF THIS UNIQUE ORGANIZATION DOES NOT APPEAR TO PROVIDE THE BN WITH SPECIAL CAPABILITY. FOR PURPOSES OF UNIFORMITY, TRAINING, AND OPERATIONAL FLEXIBILITY, THE SIT SHOULD BE A T/O RIFLE COMPANY, OR IT SHOULD BE ELIMINATED AND ITS PERSONNEL ASSIGNED TO THE REMAINING THREE COMPANIES. THE CONCEPT OF EMPLOYMENT STATED ON PAGE VII-36, REF B, CAN APPLY TO ANY OF THE

PAGE 04 PUNOSGG6335 UNCLAS
RIFLE COMPANIES. UNLESS SIT REMAINS UNCOMMITTED IN VICINITY OF UNCOMMITTED COMBINED ARMS COMPANY WEAPONS SECTIONS, IT IS NO EASIER TO TASK ORGANIZE OR "WEAPONS ORGANIZE" THE SIT THAN IT IS TO TASK OR WEAPONS ORGANIZE A RIFLE COMPANY. HAVING A PART-TIME COMMANDER (THE COMBINED ARMS COMPANY XO) DOES NOT ENHANCE COMBAT EFFICIENCY. ON THE SURFACE, THERE APPEARS TO BE NO BASIS FOR THE CONTENTION THAT THE SIT WOULD INCREASE BATTALION TACTICAL FLEXIBILITY; TO THE CONTRACY IT MAY DECREASE IT.

RECOMMENDATION: ELIMINATE THE SIT AND CREATE A FOURTH RIFLE COMPANY, OR INCREASE PERSONNEL STRENGTHS OF EXISTING THREE RIFLE COMPANIES.

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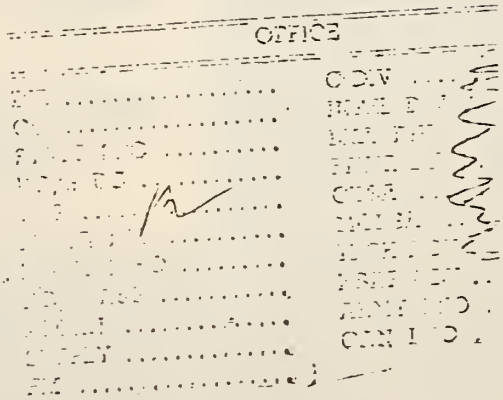

ROUTINE

* U N C L A S S I F I E D *

VE 23 .M3734 1980

Marine infantry battalion, 1980-1990

MCB 5070/2 (1/97)

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